

DV Qualifiers
in database
-HR

checked by, R
2/13/17

CERTIFICATION

SDG No: JC34496 Laboratory: Accutest, New Jersey
Site: BMS, Building 5 Area, PR Matrix: Groundwater
4th Q 2016 Groundwater Sampling - Onsite Wells
Humacao, PR

SUMMARY: Groundwater samples (Table 1) were collected on the BMSMC facility – Building 5 Area. The BMSMC facility is located in Humacao, PR. Samples were taken December 22-23, 2016 and were analyzed in Accutest Laboratory of Dayton, New Jersey for the parameters shown in Table 1. The results were reported under SDG No.: JC34496. Results were validated using the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section. Individual data review worksheets are enclosed for each target analyte group. The data sample summary form shows for analytes results that were qualified.

In summary the results are valid and can be used for decision taking purposes.

Table 1. Samples analyzed and analysis performed

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	ANALYSIS PERFORMED
JC34496-1	MW-20S	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA; Inorganics; Methane
JC34496-2	FB122216	AQ - Field Blank Water	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-3	MW-20D	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-4	RA-10S	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA; Inorganics; Methane
JC34496-5	TB122216NRB	AQ – Trip Blank Water	VOCs
JC34496-6	TB122216RS	AQ – Trip Blank Water	VOCs
JC34496-7	EB122316	AQ- Equipment Blank	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-8	S-40D	Groundwater	VOCs
JC34496-9	FB122316	AQ- Field Blank Water	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-10	MW-19	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA; Inorganics; Methane
JC34496-11	TB122316NR	AQ – Trip Blank Water	VOCs
JC34496-12	MW-16	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-12D	MW-16 MSD	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA
JC34496-12S	MW-16 MS	Groundwater	VOCs; SVOCs; PAHs + 1,4-Dioxane (SIM); LMWA

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	ANALYSIS PERFORMED
JC34496-13	TB122316RS	AQ – Trip Blank Water	VOCs

Reviewer Name: Rafael Infante
Chemist License 1888

Signature:
Date:

Rafael Infante
February 3, 2017



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Report of Analysis

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Client Sample ID: MW-20S
 Lab Sample ID: JC34496-1
 Matrix: AQ - Ground Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68074.D	1	01/03/17	HT	n/a	n/a	V4B2797
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		76-120%
17060-07-0	1,2-Dichloroethane-D4	112%		73-122%
2037-26-5	Toluene-D8	98%		84-119%
460-00-4	4-Bromofluorobenzene	114%		78-117%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: MW-20S
 Lab Sample ID: JC34496-1
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z117728.D	1	01/04/17	CS	12/29/16	OP99556	EZ5850
Run #2							

Run #	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.1	0.84	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	0.91	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.0	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	10	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.1	1.3	ug/l	
95-48-7	2-Methylphenol	ND	2.0	0.91	ug/l	
	3&4-Methylphenol	ND	2.0	0.90	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.1	1.4	ug/l	
108-95-2	Phenol	ND	2.0	0.40	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.1	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	0.94	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	ND	2.0	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.22	ug/l	
1912-24-9	Atrazine	ND	2.0	0.46	ug/l	
100-52-7	Benzaldehyde	ND	5.1	0.29	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.21	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.35	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.41	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.0	0.47	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.22	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.0	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	0.35	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	

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Report of Analysis

Client Sample ID: MW-20S
 Lab Sample ID: JC34496-1
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.0	0.66	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.0	0.28	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.0	0.25	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.0	0.41	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.37	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.56	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.49	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.0	0.52	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.34	ug/l	
132-64-9	Dibenzofuran	ND	5.1	0.22	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.0	0.51	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.0	0.24	ug/l	
84-66-2	Diethyl phthalate	ND	2.0	0.27	ug/l	
131-11-3	Dimethyl phthalate	ND	2.0	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.0	1.7	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.50	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	10	2.8	ug/l	
67-72-1	Hexachloroethane	ND	2.0	0.40	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.34	ug/l	
78-59-1	Isophorone	ND	2.0	0.28	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.27	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.21	ug/l	
88-74-4	2-Nitroaniline	ND	5.1	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.1	0.39	ug/l	
100-01-6	4-Nitroaniline	ND	5.1	0.45	ug/l	
98-95-3	Nitrobenzene	ND	2.0	0.66	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.0	0.49	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	0.23	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.0	0.38	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	47%		14-88%
4165-62-2	Phenol-d5	32%		10-110%

ND = Not detected MDL = Method Detection Limit
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Report of Analysis

Client Sample ID:	MW-20S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-1	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	102%		39-149%
4165-60-0	Nitrobenzene-d5	75%		32-128%
321-60-8	2-Fluorobiphenyl	68%		35-119%
1718-51-0	Terphenyl-d14	68%		10-126%



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Report of Analysis

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Client Sample ID: MW-20S
 Lab Sample ID: JC34496-1
 Matrix: AQ - Ground Water
 Method: SW846 8270D BY SIM SW846 3510C
 Project: BSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69396.D	1	12/31/16	SG	12/29/16	OP99556A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.051	0.023	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.051	0.034	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.10	0.044	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.10	0.034	ug/l	
218-01-9	Chrysene	ND	0.10	0.027	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.10	0.037	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.10	0.039	ug/l	
91-20-3	Naphthalene	ND	0.10	0.030	ug/l	
123-91-1	1,4-Dioxane	1.61	0.10	0.050	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		24-125%
321-60-8	2-Fluorobiphenyl	61%		19-127%
1718-51-0	Terphenyl-d14	71%		10-119%



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 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	MW-20S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-1	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846-8015C (DAI)		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108028.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	95%		56-145%
111-27-3	Hexanol	83%		56-145%



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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID: MW-20S
Lab Sample ID: JC34496-1
Matrix: AQ - Ground Water
Method: RSK-175
Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
Date Received: 12/29/16
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA56686.D	1	01/03/17	LM	n/a	n/a	GAA1105
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	26.3	0.11	0.036	ug/l	



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RL = Reporting Limit
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B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: MW-20S
Lab Sample ID: JC34496-1
Matrix: AQ - Ground Water
Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
Date Received: 12/29/16
Percent Solids: n/a

4.1

4

Total Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	8760	100	12	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²
Manganese	315	15	0.39	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA41084

(2) Prep QC Batch: MP97923



RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID: MW-20S
 Lab Sample ID: JC34496-1
 Matrix: AQ - Ground Water
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

4.1

4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO ₃	148	5.0	mg/l	1	12/30/16 16:59	JA	SM2320 B-11
Iron, Ferric ^a	8.6	0.30	mg/l	1	01/02/17 11:01	GT	SM3500FE B-11
Iron, Ferrous ^b	< 0.20	0.20	mg/l	1	12/29/16 21:54	AT	SM3500FE B-11
Nitrogen, Nitrate ^c	< 0.11	0.11	mg/l	1	01/06/17 14:36	MP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	< 0.10	0.10	mg/l	1	01/06/17 14:36	MP	EPA 353.2/LACHAT
Nitrogen, Nitrite ^d	< 0.010	0.010	mg/l	1	12/30/16 09:19	YR	SM4500NO2 B-11
Sulfate	18.0	10	mg/l	1	01/09/17 16:48	JN	EPA 300/SW846 9056A
Sulfide	< 2.0	2.0	mg/l	1	12/29/16	MP	SM4500S2- F-11

(a) Calculated as: (Iron) - (Iron, Ferrous)

(b) Field analysis required. Received out of hold time and analyzed by request.

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite) Nitrogen, Nitrite analysis done past holding time.

(d) Sample received outside the holding time.



RL = Reporting Limit

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Report of Analysis

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Client Sample ID:	FB122216	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-2	Date Received:	12/29/16
Matrix:	AQ - Field Blank Water	Percent Solids:	n/a
Method:	SW846 8260C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68129.D	1	01/05/17	HT	n/a	n/a	V4B2800
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		76-120%
17060-07-0	1,2-Dichloroethane-D4	111%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	108%		78-117%



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SGS Accutest

Report of Analysis

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Client Sample ID: FB122216
 Lab Sample ID: JC34496-2
 Matrix: AQ - Field Blank Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z117729.D	1	01/04/17	CS	12/29/16	OP99556	EZ5850
Run #2							

Run #	Initial Volume	Final Volume
Run #1	940 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.3	0.87	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.3	0.95	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.1	1.4	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.3	2.6	ug/l	
51-28-5	2,4-Dinitrophenol	ND	11	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.3	1.4	ug/l	
95-48-7	2-Methylphenol	ND	2.1	0.94	ug/l	
	3&4-Methylphenol	ND	2.1	0.94	ug/l	
88-75-5	2-Nitrophenol	ND	5.3	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	11	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.3	1.5	ug/l	
108-95-2	Phenol	ND	2.1	0.42	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.3	1.6	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.3	1.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.3	0.98	ug/l	
83-32-9	Acenaphthene	ND	1.1	0.20	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.14	ug/l	
98-86-2	Acetophenone	ND	2.1	0.22	ug/l	
120-12-7	Anthracene	ND	1.1	0.22	ug/l	
1912-24-9	Atrazine	ND	2.1	0.48	ug/l	
100-52-7	Benzaldehyde	ND	5.3	0.31	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.1	0.22	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.1	0.23	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.1	0.22	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.1	0.36	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.1	0.22	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.1	0.43	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.1	0.49	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.1	0.23	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.1	0.25	ug/l	
106-47-8	4-Chloroaniline	ND	5.3	0.36	ug/l	
86-74-8	Carbazole	ND	1.1	0.24	ug/l	

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Report of Analysis

Client Sample ID: FB122216
 Lab Sample ID: JC34496-2
 Matrix: AQ - Field Blank Water
 Method: SW846 8270D SW846 3510C
 Project: BSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

4.2
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ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.1	0.69	ug/l	
218-01-9	Chrysene	ND	1.1	0.19	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.1	0.30	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.1	0.26	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.1	0.43	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.1	0.39	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.1	0.59	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.1	0.51	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.1	0.54	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.1	0.35	ug/l	
132-64-9	Dibenzofuran	ND	5.3	0.23	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.1	0.53	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.1	0.25	ug/l	
84-66-2	Diethyl phthalate	ND	2.1	0.28	ug/l	
131-11-3	Dimethyl phthalate	ND	2.1	0.23	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.1	1.8	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.18	ug/l	
86-73-7	Fluorene	ND	1.1	0.18	ug/l	
118-74-1	Hexachlorobenzene	ND	1.1	0.35	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.1	0.52	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	11	3.0	ug/l	
67-72-1	Hexachloroethane	ND	2.1	0.41	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.1	0.35	ug/l	
78-59-1	Isophorone	ND	2.1	0.29	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.22	ug/l	
88-74-4	2-Nitroaniline	ND	5.3	0.29	ug/l	
99-09-2	3-Nitroaniline	ND	5.3	0.41	ug/l	
100-01-6	4-Nitroaniline	ND	5.3	0.47	ug/l	
98-95-3	Nitrobenzene	ND	2.1	0.68	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.1	0.51	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.3	0.24	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.19	ug/l	
129-00-0	Pyrene	ND	1.1	0.23	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.1	0.39	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	43%		14-88%
4165-62-2	Phenol-d5	29%		10-110%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FB122216	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-2	Date Received:	12/29/16
Matrix:	AQ - Field Blank Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	82%		39-149%
4165-60-0	Nitrobenzene-d5	67%		32-128%
321-60-8	2-Fluorobiphenyl	60%		35-119%
1718-51-0	Terphenyl-d14	71%		10-126%



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: FB122216
 Lab Sample ID: JC34496-2
 Matrix: AQ - Field Blank Water
 Method: SW846 8270D BY SIM SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69397.D	1	12/31/16	SG	12/29/16	OP99556A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	940 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.053	0.024	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.053	0.035	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.11	0.046	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.11	0.035	ug/l	
218-01-9	Chrysene	ND	0.11	0.028	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.11	0.039	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.11	0.040	ug/l	
91-20-3	Naphthalene	ND	0.11	0.031	ug/l	
123-91-1	1,4-Dioxane	ND	0.11	0.052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	53%		24-125%
321-60-8	2-Fluorobiphenyl	58%		19-127%
1718-51-0	Terphenyl-d14	79%		10-119%



ND = Not detected MDL = Method Detection Limit
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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: FB122216
 Lab Sample ID: JC34496-2
 Matrix: AQ - Field Blank Water
 Method: SW846-8015C (DAI)
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108029.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	92%		56-145%
111-27-3	Hexanol	86%		56-145%



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 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-20D	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-3	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68130.D	1	01/05/17	HT	n/a	n/a	V4B2800
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		76-120%
17060-07-0	1,2-Dichloroethane-D4	112%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	108%		78-117%



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 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 3

Client Sample ID: MW-20D
 Lab Sample ID: JC34496-3
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z117730.D	1	01/04/17	CS	12/29/16	OP99556	EZ5850
Run #2							

Run #	Initial Volume	Final Volume
Run #1	990 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.1	0.83	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	0.90	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.0	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	10	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.1	1.3	ug/l	
95-48-7	2-Methylphenol	ND	2.0	0.90	ug/l	
	3&4-Methylphenol	ND	2.0	0.89	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	0.97	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.0	1.4	ug/l	
108-95-2	Phenol	ND	2.0	0.40	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.1	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.3	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	0.93	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	ND	2.0	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.21	ug/l	
1912-24-9	Atrazine	ND	2.0	0.45	ug/l	
100-52-7	Benzaldehyde	ND	5.1	0.29	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.21	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.34	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.41	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.0	0.46	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.21	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.0	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	0.34	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	

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 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: MW-20D
 Lab Sample ID: JC34496-3
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

4.3

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ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.0	0.66	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.0	0.28	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.0	0.25	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.0	0.41	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.37	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.56	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.48	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.0	0.51	ug/l	
123-91-1	1,4-Dioxane	8.6	1.0	0.66	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.33	ug/l	
132-64-9	Dibenzofuran	ND	5.1	0.22	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.0	0.50	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.0	0.24	ug/l	
84-66-2	Diethyl phthalate	ND	2.0	0.26	ug/l	
131-11-3	Dimethyl phthalate	ND	2.0	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.0	1.7	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.50	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	10	2.8	ug/l	
67-72-1	Hexachloroethane	ND	2.0	0.39	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.34	ug/l	
78-59-1	Isophorone	ND	2.0	0.28	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.27	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.21	ug/l	
88-74-4	2-Nitroaniline	ND	5.1	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.1	0.39	ug/l	
100-01-6	4-Nitroaniline	ND	5.1	0.44	ug/l	
98-95-3	Nitrobenzene	ND	2.0	0.65	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.0	0.49	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	0.22	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.0	0.37	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		14-88%

ND = Not detected MDL = Method Detection Limit
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 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	MW-20D	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-3	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	27%		10-110%
118-79-6	2,4,6-Tribromophenol	89%		39-149%
4165-60-0	Nitrobenzene-d5	66%		32-128%
321-60-8	2-Fluorobiphenyl	61%		35-119%
1718-51-0	Terphenyl-d14	60%		10-126%



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SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-20D	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-3	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D BY SIM SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69398.D	1	12/31/16	SG	12/29/16	OP99556A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	990 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.051	0.023	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.051	0.034	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.10	0.044	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.10	0.033	ug/l	
218-01-9	Chrysene	ND	0.10	0.026	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.10	0.037	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.10	0.038	ug/l	
91-20-3	Naphthalene	ND	0.10	0.030	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	56%		24-125%
321-60-8	2-Fluorobiphenyl	61%		19-127%
1718-51-0	Terphenyl-d14	68%		10-119%



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 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-20D	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-3	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846-8015C (DAI)		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108030.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	101%		56-145%
111-27-3	Hexanol	80%		56-145%



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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: RA-10S
 Lab Sample ID: JC34496-4
 Matrix: AQ - Ground Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68131.D	1	01/05/17	HT	n/a	n/a	V4B2800
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		76-120%
17060-07-0	1,2-Dichloroethane-D4	111%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	106%		78-117%



ND = Not detected MDL = Method Detection Limit
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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 3

Client Sample ID: RA-10S
 Lab Sample ID: JC34496-4
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z117731.D	1	01/04/17	CS	12/29/16	OP99556	EZ5850
Run #2	6P33779.D	20	01/06/17	AC	12/29/16	OP99556	E6P1553

Run #	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2	900 ml	1.0 ml

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.6	0.91	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	0.99	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.2	1.4	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.7	ug/l	
51-28-5	2,4-Dinitrophenol	ND	11	1.7	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.6	1.4	ug/l	
95-48-7	2-Methylphenol	ND	2.2	0.99	ug/l	
	3&4-Methylphenol	ND	2.2	0.98	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	1.1	ug/l	
100-02-7	4-Nitrophenol	ND	11	1.3	ug/l	
87-86-5	Pentachlorophenol	ND	4.4	1.5	ug/l	
108-95-2	Phenol	ND	2.2	0.44	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.6	1.6	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	1.5	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	1.0	ug/l	
83-32-9	Acenaphthene	ND	1.1	0.21	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.15	ug/l	
98-86-2	Acetophenone	ND	2.2	0.23	ug/l	
120-12-7	Anthracene	ND	1.1	0.23	ug/l	
1912-24-9	Atrazine	ND	2.2	0.50	ug/l	
100-52-7	Benzaldehyde	ND	5.6	0.32	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.1	0.23	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.1	0.24	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.1	0.23	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.1	0.38	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.1	0.23	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.2	0.45	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.2	0.51	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.1	0.24	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.2	0.26	ug/l	
106-47-8	4-Chloroaniline	ND	5.6	0.38	ug/l	
86-74-8	Carbazole	ND	1.1	0.25	ug/l	



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RA-10S
 Lab Sample ID: JC34496-4
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

4.4
4

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.2	0.72	ug/l	
218-01-9	Chrysene	ND	1.1	0.20	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.2	0.31	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.2	0.28	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.2	0.45	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.2	0.41	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.1	0.61	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.1	0.53	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.2	0.56	ug/l	
123-91-1	1,4-Dioxane	1290 ^a	22	15	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.1	0.37	ug/l	
132-64-9	Dibenzofuran	ND	5.6	0.24	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.2	0.55	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.2	0.26	ug/l	
84-66-2	Diethyl phthalate	ND	2.2	0.29	ug/l	
131-11-3	Dimethyl phthalate	ND	2.2	0.24	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.2	1.8	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.19	ug/l	
86-73-7	Fluorene	ND	1.1	0.19	ug/l	
118-74-1	Hexachlorobenzene	ND	1.1	0.36	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.1	0.55	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	11	3.1	ug/l	
67-72-1	Hexachloroethane	ND	2.2	0.43	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.1	0.37	ug/l	
78-59-1	Isophorone	ND	2.2	0.31	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.29	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.23	ug/l	
88-74-4	2-Nitroaniline	ND	5.6	0.31	ug/l	
99-09-2	3-Nitroaniline	ND	5.6	0.43	ug/l	
100-01-6	4-Nitroaniline	ND	5.6	0.49	ug/l	
98-95-3	Nitrobenzene	ND	2.2	0.71	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.2	0.53	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.19	ug/l	
129-00-0	Pyrene	ND	1.1	0.24	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.2	0.41	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%	44%	14-88%

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J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	RA-10S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-4	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	29%	28%	10-110%
118-79-6	2,4,6-Tribromophenol	83%	68%	39-149%
4165-60-0	Nitrobenzene-d5	64%	71%	32-128%
321-60-8	2-Fluorobiphenyl	60%	63%	35-119%
1718-51-0	Terphenyl-d14	56%	61%	10-126%

(a) Result is from Run# 2



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	RA-10S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-4	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D BY SIM SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69399.D	1	12/31/16	SG	12/29/16	OP99556A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.056	0.025	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.056	0.037	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.11	0.048	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.11	0.037	ug/l	
218-01-9	Chrysene	ND	0.11	0.029	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.11	0.040	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.11	0.042	ug/l	
91-20-3	Naphthalene	ND	0.11	0.033	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	52%		24-125%
321-60-8	2-Fluorobiphenyl	56%		19-127%
1718-51-0	Terphenyl-d14	60%		10-119%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	RA-10S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-4	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846-8015C (DAI)		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108024.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	103%		56-145%
111-27-3	Hexanol	81%		56-145%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	RA-10S	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-4	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	RSK-175		
Project:	BMSMC, Building 5 Area, PR		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2	AA56687.D	1	01/03/17	LM	n/a	n/a	GAA1105

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	13.9	0.11	0.036	ug/l	



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RA-10S
Lab Sample ID: JC34496-4
Matrix: AQ - Ground Water
Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
Date Received: 12/29/16
Percent Solids: n/a

4.4

4

Total Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	458	100	12	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²
Manganese	2260	15	0.39	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA41084

(2) Prep QC Batch: MP97923



RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: RA-10S
 Lab Sample ID: JC34496-4
 Matrix: AQ - Ground Water
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

4.4
4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO ₃	222	5.0	mg/l	1	12/30/16 16:59	JA	SM2320 B-11
Iron, Ferric ^a	0.41	0.30	mg/l	1	01/02/17 12:26	GT	SM3500FE B-11
Iron, Ferrous ^b	< 0.20	0.20	mg/l	1	12/29/16 21:54	AT	SM3500FE B-11
Nitrogen, Nitrate ^c	< 0.11	0.11	mg/l	1	01/06/17 14:37	MP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	< 0.10	0.10	mg/l	1	01/06/17 14:37	MP	EPA 353.2/LACHAT
Nitrogen, Nitrite ^d	< 0.010	0.010	mg/l	1	12/30/16 09:19	YR	SM4500NO2 B-11
Sulfate	< 10	10	mg/l	1	01/09/17 17:12	JN	EPA 300/SW846 9056A
Sulfide	< 2.0	2.0	mg/l	1	12/29/16	MP	SM4500S2- F-11

(a) Calculated as: (Iron) - (Iron, Ferrous)

(b) Field analysis required. Received out of hold time and analyzed by request.

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite) Nitrogen, Nitrite analysis done past holding time.

(d) Sample received outside the holding time.



RL = Reporting Limit

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: TB122216NRB
 Lab Sample ID: JC34496-5
 Matrix: AQ - Trip Blank Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/22/16
 Date Received: 12/29/16
 Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	4B68205.D	1	01/06/17	HT	n/a	n/a	V4B2803
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	116%		76-120%
17060-07-0	1,2-Dichloroethane-D4	117%		73-122%
2037-26-5	Toluene-D8	106%		84-119%
460-00-4	4-Bromofluorobenzene	107%		78-117%

(a) Sample analyzed outside the holding time due to login error.



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	TB122216RS	Date Sampled:	12/22/16
Lab Sample ID:	JC34496-6	Date Received:	12/29/16
Matrix:	AQ - Trip Blank Water	Percent Solids:	n/a
Method:	SW846 8260C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	4B68189.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	116%		76-120%
17060-07-0	1,2-Dichloroethane-D4	115%		73-122%
2037-26-5	Toluene-D8	106%		84-119%
460-00-4	4-Bromofluorobenzene	109%		78-117%

(a) Sample analyzed outside the holding time due to login error.



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: EB122316
 Lab Sample ID: JC34496-7
 Matrix: AQ - Equipment Blank
 Method: SW846 8260C
 Project: BSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68180.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	115%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	111%		78-117%



ND = Not detected MDL = Method Detection Limit
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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 3

Client Sample ID:	EB122316	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-7	Date Received:	12/29/16
Matrix:	AQ - Equipment Blank	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M90443.D	1	01/05/17	AN	12/30/16	OP99558	E2M4013
Run #2							

Run #	Initial Volume	Final Volume
Run #1	925 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.4	0.89	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.4	0.96	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.2	1.4	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.4	2.6	ug/l	
51-28-5	2,4-Dinitrophenol	ND	11	1.7	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.4	1.4	ug/l	
95-48-7	2-Methylphenol	ND	2.2	0.96	ug/l	
	3&4-Methylphenol	ND	2.2	0.95	ug/l	
88-75-5	2-Nitrophenol	ND	5.4	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	11	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.3	1.5	ug/l	
108-95-2	Phenol	ND	2.2	0.42	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.4	1.6	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.4	1.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.4	1.0	ug/l	
83-32-9	Acenaphthene	ND	1.1	0.21	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.15	ug/l	
98-86-2	Acetophenone	ND	2.2	0.22	ug/l	
120-12-7	Anthracene	ND	1.1	0.23	ug/l	
1912-24-9	Atrazine	ND	2.2	0.48	ug/l	
100-52-7	Benzaldehyde	ND	5.4	0.31	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.1	0.22	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.1	0.23	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.1	0.22	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.1	0.37	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.1	0.22	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.2	0.44	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.2	0.49	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.1	0.23	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.2	0.26	ug/l	
106-47-8	4-Chloroaniline	ND	5.4	0.37	ug/l	
86-74-8	Carbazole	ND	1.1	0.25	ug/l	



ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: EB122316
 Lab Sample ID: JC34496-7
 Matrix: AQ - Equipment Blank
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.2	0.70	ug/l	
218-01-9	Chrysene	ND	1.1	0.19	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.2	0.30	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.2	0.27	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.2	0.44	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.2	0.40	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.1	0.60	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.1	0.51	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.2	0.55	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.1	0.36	ug/l	
132-64-9	Dibenzofuran	ND	5.4	0.24	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.2	0.54	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.2	0.25	ug/l	
84-66-2	Diethyl phthalate	ND	2.2	0.28	ug/l	
131-11-3	Dimethyl phthalate	ND	2.2	0.24	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.2	1.8	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.18	ug/l	
86-73-7	Fluorene	ND	1.1	0.18	ug/l	
118-74-1	Hexachlorobenzene	ND	1.1	0.35	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.1	0.53	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	11	3.0	ug/l	
67-72-1	Hexachloroethane	ND	2.2	0.42	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.1	0.36	ug/l	
78-59-1	Isophorone	ND	2.2	0.30	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.23	ug/l	
88-74-4	2-Nitroaniline	ND	5.4	0.30	ug/l	
99-09-2	3-Nitroaniline	ND	5.4	0.42	ug/l	
100-01-6	4-Nitroaniline	ND	5.4	0.48	ug/l	
98-95-3	Nitrobenzene	ND	2.2	0.69	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.2	0.52	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.4	0.24	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.19	ug/l	
129-00-0	Pyrene	ND	1.1	0.24	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.2	0.40	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		14-88%
4165-62-2	Phenol-d5	28%		10-110%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	EB122316	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-7	Date Received:	12/29/16
Matrix:	AQ - Equipment Blank	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	83%		39-149%
4165-60-0	Nitrobenzene-d5	69%		32-128%
321-60-8	2-Fluorobiphenyl	75%		35-119%
1718-51-0	Terphenyl-d14	95%		10-126%



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	EB122316	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-7	Date Received:	12/29/16
Matrix:	AQ - Equipment Blank	Percent Solids:	n/a
Method:	SW846 8270D BY SIM SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69403.D	1	12/31/16	SG	12/30/16	OP99558A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	925 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.054	0.025	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.054	0.036	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.11	0.047	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.11	0.036	ug/l	
218-01-9	Chrysene	ND	0.11	0.028	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.11	0.039	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.11	0.041	ug/l	
91-20-3	Naphthalene	ND	0.11	0.032	ug/l	
123-91-1	1,4-Dioxane	ND	0.11	0.053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		24-125%
321-60-8	2-Fluorobiphenyl	67%		19-127%
1718-51-0	Terphenyl-d14	96%		10-119%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: EB122316
 Lab Sample ID: JC34496-7
 Matrix: AQ - Equipment Blank
 Method: SW846-8015C (DAI)
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108023.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	104%		56-145%
111-27-3	Hexanol	79%		56-145%



ND = Not detected MDL = Method Detection Limit
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 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

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Client Sample ID:	S-40D	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-8	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68184.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	117%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	109%		78-117%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: FB122316
 Lab Sample ID: JC34496-9
 Matrix: AQ - Field Blank Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68181.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	117%		73-122%
2037-26-5	Toluene-D8	106%		84-119%
460-00-4	4-Bromofluorobenzene	110%		78-117%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID:	FB122316	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-9	Date Received:	12/29/16
Matrix:	AQ - Field Blank Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M90444A.D	1	01/05/17	AN	12/30/16	OP99558	E2M4013
Run #2							

Run #	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.0	0.82	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	0.89	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.0	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.4	ug/l	
51-28-5	2,4-Dinitrophenol	ND	10	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.0	1.3	ug/l	
95-48-7	2-Methylphenol	ND	2.0	0.89	ug/l	
	3&4-Methylphenol	ND	2.0	0.88	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	0.96	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.0	1.4	ug/l	
108-95-2	Phenol	ND	2.0	0.39	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.0	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.3	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	0.92	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	ND	2.0	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.21	ug/l	
1912-24-9	Atrazine	ND	2.0	0.45	ug/l	
100-52-7	Benzaldehyde	ND	5.0	0.29	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.20	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.21	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.34	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.40	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.0	0.46	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.21	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.0	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	0.34	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	



ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

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B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: FB122316
 Lab Sample ID: JC34496-9
 Matrix: AQ - Field Blank Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.0	0.65	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.0	0.28	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.0	0.25	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.0	0.40	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.37	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.55	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.48	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.0	0.51	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.33	ug/l	
132-64-9	Dibenzofuran	ND	5.0	0.22	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.0	0.50	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.0	0.23	ug/l	
84-66-2	Diethyl phthalate	ND	2.0	0.26	ug/l	
131-11-3	Dimethyl phthalate	ND	2.0	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.0	1.7	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.49	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	10	2.8	ug/l	
67-72-1	Hexachloroethane	ND	2.0	0.39	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.33	ug/l	
78-59-1	Isophorone	ND	2.0	0.28	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.21	ug/l	
88-74-4	2-Nitroaniline	ND	5.0	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.0	0.39	ug/l	
100-01-6	4-Nitroaniline	ND	5.0	0.44	ug/l	
98-95-3	Nitrobenzene	ND	2.0	0.64	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.0	0.48	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	0.22	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.0	0.37	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		14-88%
4165-62-2	Phenol-d5	25%		10-110%



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 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FB122316	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-9	Date Received:	12/29/16
Matrix:	AQ - Field Blank Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	83%		39-149%
4165-60-0	Nitrobenzene-d5	63%		32-128%
321-60-8	2-Fluorobiphenyl	69%		35-119%
1718-51-0	Terphenyl-d14	93%		10-126%



ND = Not detected MDL = Method Detection Limit
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N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: FB122316
 Lab Sample ID: JC34496-9
 Matrix: AQ - Field Blank Water
 Method: SW846 8270D BY SIM SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69404.D	1	12/31/16	SG	12/30/16	OP99558A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.050	0.023	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.050	0.033	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.10	0.043	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.10	0.033	ug/l	
218-01-9	Chrysene	ND	0.10	0.026	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.10	0.036	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.10	0.038	ug/l	
91-20-3	Naphthalene	ND	0.10	0.029	ug/l	
123-91-1	1,4-Dioxane	ND	0.10	0.049	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		24-125%
321-60-8	2-Fluorobiphenyl	66%		19-127%
1718-51-0	Terphenyl-d14	98%		10-119%



ND = Not detected MDL = Method Detection Limit
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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: FB122316
 Lab Sample ID: JC34496-9
 Matrix: AQ - Field Blank Water
 Method: SW846-8015C (DAI)
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108022.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	110%		56-145%
111-27-3	Hexanol	85%		56-145%



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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

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Client Sample ID: MW-19
 Lab Sample ID: JC34496-10
 Matrix: AQ - Ground Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68185.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	119%		73-122%
2037-26-5	Toluene-D8	106%		84-119%
460-00-4	4-Bromofluorobenzene	110%		78-117%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 3

Client Sample ID:	MW-19	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-10	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2M90445.D	1	01/05/17	AN	12/30/16	OP99558	E2M4013
Run #2							

Run #	Initial Volume	Final Volume
Run #1	975 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.1	0.84	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	0.91	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.1	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	8.5	5.1	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	10	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.1	1.3	ug/l	
95-48-7	2-Methylphenol	ND	2.1	0.91	ug/l	
	3&4-Methylphenol	ND	2.1	0.90	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.1	1.4	ug/l	
108-95-2	Phenol	ND	2.1	0.40	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.1	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	0.95	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.20	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	2.4	2.1	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.22	ug/l	
1912-24-9	Atrazine	ND	2.1	0.46	ug/l	
100-52-7	Benzaldehyde	ND	5.1	0.30	ug/l	
56-55-3	Benzo(a)anthracene	0.50	1.0	0.21	ug/l	J
50-32-8	Benzo(a)pyrene	ND	1.0	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.35	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.1	0.41	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.1	0.47	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.22	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.1	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	0.35	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: MW-19
 Lab Sample ID: JC34496-10
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.1	0.67	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.1	0.29	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.1	0.25	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.1	0.41	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.1	0.38	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.57	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.49	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.1	0.52	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.34	ug/l	
132-64-9	Dibenzofuran	ND	5.1	0.23	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.1	0.51	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.1	0.24	ug/l	
84-66-2	Diethyl phthalate	ND	2.1	0.27	ug/l	
131-11-3	Dimethyl phthalate	ND	2.1	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.1	1.7	ug/l	
206-44-0	Fluoranthene	3.1	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.18	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.50	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	10	2.9	ug/l	
67-72-1	Hexachloroethane	ND	2.1	0.40	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.34	ug/l	
78-59-1	Isophorone	ND	2.1	0.28	ug/l	
90-12-0	1-Methylnaphthalene	1.4	1.0	0.27	ug/l	
91-57-6	2-Methylnaphthalene	1.4	1.0	0.22	ug/l	
88-74-4	2-Nitroaniline	ND	5.1	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.1	0.40	ug/l	
100-01-6	4-Nitroaniline	ND	5.1	0.45	ug/l	
98-95-3	Nitrobenzene	ND	2.1	0.66	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.1	0.49	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	0.23	ug/l	
85-01-8	Phenanthrene	0.53	1.0	0.18	ug/l	J
129-00-0	Pyrene	2.0	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.1	0.38	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	37%		14-88%
4165-62-2	Phenol-d5	27%		10-110%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	MW-19	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-10	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	96%		39-149%
4165-60-0	Nitrobenzene-d5	68%		32-128%
321-60-8	2-Fluorobiphenyl	76%		35-119%
1718-51-0	Terphenyl-d14	86%		10-126%



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-19	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-10	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D BY SIM SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M69405.D	1	12/31/16	SG	12/30/16	OP99558A	E4M3182
Run #2							

Run #	Initial Volume	Final Volume
Run #1	975 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	0.427	0.051	0.023	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.051	0.034	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.10	0.045	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.10	0.034	ug/l	
218-01-9	Chrysene	0.106	0.10	0.027	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.10	0.037	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.10	0.039	ug/l	
91-20-3	Naphthalene	1.51	0.10	0.030	ug/l	
123-91-1	1,4-Dioxane	0.262	0.10	0.050	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		24-125%
321-60-8	2-Fluorobiphenyl	67%		19-127%
1718-51-0	Terphenyl-d14	74%		10-119%



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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-19	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-10	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846-8015C (DAI)		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108021.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	96%		56-145%
111-27-3	Hexanol	76%		56-145%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Report of Analysis

Page 1 of 1

Client Sample ID: MW-19
Lab Sample ID: JC34496-10
Matrix: AQ - Ground Water
Method: RSK-175
Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
Date Received: 12/29/16
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA56690.D	20	01/03/17	LM	n/a	n/a	GAA1105
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	1860	2.2	0.71	ug/l	



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-19	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-10	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

Total Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	8760	100	12	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²
Manganese	1260	15	0.39	ug/l	1	12/31/16	01/02/17 GT	SW846 6010C ¹	SW846 3010A ²

(1) Instrument QC Batch: MA41084

(2) Prep QC Batch: MP97923



RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID: MW-19	Date Sampled: 12/23/16
Lab Sample ID: JC34496-10	Date Received: 12/29/16
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: BSMC, Building 5 Area, PR	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO ₃	156	5.0	mg/l	1	12/30/16 16:59	JA	SM2320 B-11
Iron, Ferric ^a	8.4	0.30	mg/l	1	01/02/17 11:07	GT	SM3500FE B-11
Iron, Ferrous ^b	0.32	0.20	mg/l	1	12/29/16 21:54	AT	SM3500FE B-11
Nitrogen, Nitrate ^c	< 0.11	0.11	mg/l	1	01/06/17 14:38	MP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	< 0.10	0.10	mg/l	1	01/06/17 14:38	MP	EPA 353.2/LACHAT
Nitrogen, Nitrite ^d	< 0.010	0.010	mg/l	1	12/30/16 09:19	YR	SM4500NO2 B-11
Sulfate	13.6	10	mg/l	1	01/09/17 17:36	JN	EPA 300/SW846 9056A
Sulfide	< 2.0	2.0	mg/l	1	12/29/16	MP	SM4500S2- F-11

(a) Calculated as: (Iron) - (Iron, Ferrous)

(b) Field analysis required. Received out of hold time and analyzed by request.

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite) Nitrogen, Nitrite analysis done past holding time.

(d) Sample received outside the holding time.



RL = Reporting Limit

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: TB122316NR
 Lab Sample ID: JC34496-11
 Matrix: AQ - Trip Blank Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68182.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	119%		73-122%
2037-26-5	Toluene-D8	104%		84-119%
460-00-4	4-Bromofluorobenzene	107%		78-117%



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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-16	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-12	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68083.D	1	01/04/17	HT	n/a	n/a	V4B2798
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		76-120%
17060-07-0	1,2-Dichloroethane-D4	112%		73-122%
2037-26-5	Toluene-D8	98%		84-119%
460-00-4	4-Bromofluorobenzene	115%		78-117%



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J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 3

Client Sample ID:	MW-16	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-12	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	6P33685.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
Run #2							

Run #	Initial Volume	Final Volume
Run #1	990 ml	1.0 ml
Run #2		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.1	0.83	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	0.90	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.0	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.5	ug/l	
51-28-5	2,4-Dinitrophenol	ND	10	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.1	1.3	ug/l	
95-48-7	2-Methylphenol	ND	2.0	0.90	ug/l	
	3&4-Methylphenol	ND	2.0	0.89	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	0.97	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.0	1.4	ug/l	
108-95-2	Phenol	ND	2.0	0.40	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.1	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.3	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	0.93	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	ND	2.0	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.21	ug/l	
1912-24-9	Atrazine	ND	2.0	0.45	ug/l	
100-52-7	Benzaldehyde	ND	5.1	0.29	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.21	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.34	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.41	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.0	0.46	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.21	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.0	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	0.34	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: MW-16
 Lab Sample ID: JC34496-12
 Matrix: AQ - Ground Water
 Method: SW846 8270D SW846 3510C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.0	0.66	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.0	0.28	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.0	0.25	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.0	0.41	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.37	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.56	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.48	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.0	0.51	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.33	ug/l	
132-64-9	Dibenzofuran	ND	5.1	0.22	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.0	0.50	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.0	0.24	ug/l	
84-66-2	Diethyl phthalate	ND	2.0	0.26	ug/l	
131-11-3	Dimethyl phthalate	ND	2.0	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.0	1.7	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.50	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	10	2.8	ug/l	
67-72-1	Hexachloroethane	ND	2.0	0.39	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.34	ug/l	
78-59-1	Isophorone	ND	2.0	0.28	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.27	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.21	ug/l	
88-74-4	2-Nitroaniline	ND	5.1	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.1	0.39	ug/l	
100-01-6	4-Nitroaniline	ND	5.1	0.44	ug/l	
98-95-3	Nitrobenzene	ND	2.0	0.65	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.0	0.49	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	0.22	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.0	0.37	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	43%		14-88%
4165-62-2	Phenol-d5	29%		10-110%

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	MW-16	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-12	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
118-79-6	2,4,6-Tribromophenol	81%		39-149%
4165-60-0	Nitrobenzene-d5	85%		32-128%
321-60-8	2-Fluorobiphenyl	75%		35-119%
1718-51-0	Terphenyl-d14	65%		10-126%

(a) Sample extracted outside the holding time per client's request.



ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID:	MW-16	Date Sampled:	12/23/16
Lab Sample ID:	JC34496-12	Date Received:	12/29/16
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8270D BY SIM SW846 3510C		
Project:	BMSMC, Building 5 Area, PR		

Run	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	4M69461.D	1	01/05/17	SG	01/03/17	OP99618A	E4M3187
Run #2 ^b	4M69406.D	1	12/31/16	SG	12/30/16	OP99558A	E4M3182

Run	Initial Volume	Final Volume
Run #1	990 ml	1.0 ml
Run #2	1000 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.051	0.023	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.051	0.034	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.10	0.044	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.10	0.033	ug/l	
218-01-9	Chrysene	ND	0.10	0.026	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.10	0.037	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.10	0.038	ug/l	
91-20-3	Naphthalene ^c	ND	0.10	0.030	ug/l	
123-91-1	1,4-Dioxane	0.572	0.10	0.049	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	77%	68%	24-125%
321-60-8	2-Fluorobiphenyl	72%	74%	19-127%
1718-51-0	Terphenyl-d14	61%	94%	10-119%

(a) Sample extracted outside holding time per client's request. There is compound in BS was outside in house QC limits. The results confirmed by reextraction.

(b) Confirmation run.

(c) This compound outside control limits biased low in the associated BS. The result confirmed by reextraction.



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: MW-16
 Lab Sample ID: JC34496-12
 Matrix: AQ - Ground Water
 Method: SW846-8015C (DAI)
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH108018.D	1	01/03/17	XPL	n/a	n/a	GGH5601
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	107%		56-145%
111-27-3	Hexanol	84%		56-145%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: TB122316RS
 Lab Sample ID: JC34496-13
 Matrix: AQ - Trip Blank Water
 Method: SW846 8260C
 Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/23/16
 Date Received: 12/29/16
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B68183.D	1	01/06/17	HT	n/a	n/a	V4B2802
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		76-120%
17060-07-0	1,2-Dichloroethane-D4	117%		73-122%
2037-26-5	Toluene-D8	105%		84-119%
460-00-4	4-Bromofluorobenzene	109%		78-117%



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC34496-12MS	4B68084.D	1	01/04/17	HT	n/a	n/a	V4B2798
JC34496-12MSD	4B68085.D	1	01/04/17	HT	n/a	n/a	V4B2798
JC34496-12	4B68083.D	1	01/04/17	HT	n/a	n/a	V4B2798

The QC reported here applies to the following samples:

Method: SW846 8260C

JC34496-12

CAS No.	Compound	JC34496-12 ug/l	Spike Q	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-99-0	1,3-Butadiene	ND	50	46.8	94	50	46.3	93	1	10-167/20

CAS No.	Surrogate Recoveries	MS	MSD	JC34496-12	Limits
1868-53-7	Dibromofluoromethane	107%	105%	104%	76-120%
17060-07-0	1,2-Dichloroethane-D4	109%	108%	112%	73-122%
2037-26-5	Toluene-D8	99%	99%	98%	84-119%
460-00-4	4-Bromofluorobenzene	101%	100%	115%	78-117%



* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 3

Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99618-MS2	6P33689.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
OP99618-MSD2	6P33690.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
JC34496-12 ^a	6P33685.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550

The QC reported here applies to the following samples:

Method: SW846 8270D

JC34496-12

CAS No.	Compound	JC34496-12 ug/l	Spike Q ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
95-57-8	2-Chlorophenol	ND	104	72.5	70	104	68.7	66	5	49-110/20
59-50-7	4-Chloro-3-methyl phenol	ND	104	97.1	93	104	93.3	90	4	44-121/18
120-83-2	2,4-Dichlorophenol	ND	104	85.0	82	104	80.4	77	6	42-120/19
105-67-9	2,4-Dimethylphenol	ND	104	102	98	104	95.7	92	6	33-132/23
51-28-5	2,4-Dinitrophenol	ND	208	176	84	208	180	86	2	21-145/26
534-52-1	4,6-Dinitro-o-cresol	ND	104	92.9	89	104	94.2	90	1	25-134/27
95-48-7	2-Methylphenol	ND	104	79.6	76	104	77.8	75	2	47-112/18
	3&4-Methylphenol	ND	104	76.7	74	104	74.8	72	3	44-113/19
88-75-5	2-Nitrophenol	ND	104	86.2	83	104	83.4	80	3	45-118/20
100-02-7	4-Nitrophenol	ND	104	66.7	64	104	70.1	67	5	23-144/28
87-86-5	Pentachlorophenol	ND	104	61.6	59	104	64.6	62	5	25-151/25
108-95-2	Phenol	ND	104	44.2	42	104	45.8	44	4	22-100/22
58-90-2	2,3,4,6-Tetrachlorophenol	ND	104	77.4	74	104	79.5	76	3	44-122/21
95-95-4	2,4,5-Trichlorophenol	ND	104	87.6	84	104	85.1	82	3	51-124/20
88-06-2	2,4,6-Trichlorophenol	ND	104	90.5	87	104	88.9	85	2	53-120/21
83-32-9	Acenaphthene	ND	104	87.8	84	104	84.9	82	3	52-120/23
208-96-8	Acenaphthylene	ND	104	85.5	82	104	81.7	78	5	50-101/22
98-86-2	Acetophenone	ND	104	92.9	89	104	88.8	85	5	31-141/23
120-12-7	Anthracene	ND	104	88.9	85	104	86.0	83	3	54-117/22
1912-24-9	Atrazine	ND	104	99.1	95	104	99.4	95	0	42-152/23
100-52-7	Benzaldehyde	ND	104	75.2	72	104	71.8	69	5	10-164/30
56-55-3	Benzo(a)anthracene	ND	104	86.7	83	104	85.7	82	1	40-123/24
50-32-8	Benzo(a)pyrene	ND	104	82.4	79	104	82.6	79	0	41-127/25
205-99-2	Benzo(b)fluoranthene	ND	104	82.8	79	104	82.5	79	0	39-127/27
191-24-2	Benzo(g,h,i)perylene	ND	104	79.8	77	104	79.0	76	1	34-128/28
207-08-9	Benzo(k)fluoranthene	ND	104	88.4	85	104	87.5	84	1	39-122/26
101-55-3	4-Bromophenyl phenyl ether	ND	104	88.6	85	104	84.9	82	4	51-124/23
85-68-7	Butyl benzyl phthalate	ND	104	79.6	76	104	78.4	75	2	21-146/28
92-52-4	1,1'-Biphenyl	ND	104	87.0	84	104	83.5	80	4	27-142/23
91-58-7	2-Chloronaphthalene	ND	104	82.6	79	104	76.4	73	8	51-109/23
106-47-8	4-Chloroaniline	ND	104	57.0	55	104	60.8	58	6	10-110/55
86-74-8	Carbazole	ND	104	87.8	84	104	90.0	86	2	52-116/22
105-60-2	Caprolactam	ND	104	21.2	20	104	23.8	23	12	10-106/34
218-01-9	Chrysene	ND	104	84.7	81	104	83.6	80	1	41-128/24
111-91-1	bis(2-Chloroethoxy)methane	ND	104	87.5	84	104	80.5	77	1	46-120/24
111-44-4	bis(2-Chloroethyl)ether	ND	104	87.2	84	104	83.0	80	5	42-123/28

* = Outside of Control Limits.



Matrix Spike/Matrix Spike Duplicate Summary

Page 2 of 3

Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99618-MS2	6P33689.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
OP99618-MSD2	6P33690.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
JC34496-12 ^a	6P33685.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550

The QC reported here applies to the following samples:

Method: SW846 8270D

JC34496-12

CAS No.	Compound	JC34496-12 ug/l	Spike Q ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
108-60-1	bis(2-Chloroisopropyl)ether	ND	104	72.8	70	104	66.4	64	9	41-117/25
7005-72-3	4-Chlorophenyl phenyl ether	ND	104	89.9	86	104	88.6	85	1	48-121/21
121-14-2	2,4-Dinitrotoluene	ND	104	102	98	104	100	96	2	54-123/27
606-20-2	2,6-Dinitrotoluene	ND	104	96.2	92	104	96.0	92	0	55-125/26
91-94-1	3,3'-Dichlorobenzidine	ND	208	137	66	208	143	69	4	10-107/47
53-70-3	Dibenzo(a,h)anthracene	ND	104	83.0	80	104	81.7	78	2	35-130/27
132-64-9	Dibenzofuran	ND	104	89.8	86	104	88.5	85	1	53-112/22
84-74-2	Di-n-butyl phthalate	ND	104	88.3	85	104	88.6	85	0	38-129/23
117-84-0	Di-n-octyl phthalate	ND	104	80.3	77	104	80.0	77	0	35-145/26
84-66-2	Diethyl phthalate	ND	104	89.3	86	104	89.2	86	0	16-136/30
131-11-3	Dimethyl phthalate	ND	104	90.3	87	104	89.1	86	1	10-143/39
117-81-7	bis(2-Ethylhexyl)phthalate	ND	104	80.2	77	104	81.5	78	2	34-141/28
206-44-0	Fluoranthene	ND	104	91.6	88	104	90.5	87	1	47-123/24
86-73-7	Fluorene	ND	104	88.3	85	104	87.3	84	1	56-117/22
118-74-1	Hexachlorobenzene	ND	104	89.2	86	104	86.7	83	3	46-125/24
87-68-3	Hexachlorobutadiene	ND	104	71.7	69	104	66.1	63	8	26-121/24
77-47-4	Hexachlorocyclopentadiene	ND	208	115	55	208	107	51	7	10-133/31
67-72-1	Hexachloroethane	ND	104	64.6	62	104	61.9	59	4	35-111/26
193-39-5	Indeno(1,2,3-cd)pyrene	ND	104	82.8	79	104	81.7	78	1	32-130/30
78-59-1	Isophorone	ND	104	96.1	92	104	88.4	85	8	47-126/23
90-12-0	1-Methylnaphthalene	ND	104	82.8	79	104	78.9	76	5	34-124/25
91-57-6	2-Methylnaphthalene	ND	104	84.1	81	104	79.9	77	5	34-123/24
88-74-4	2-Nitroaniline	ND	104	103	99	104	102	98	1	46-137/23
99-09-2	3-Nitroaniline	ND	104	65.7	63	104	72.5	70	10	10-110/50
100-01-6	4-Nitroaniline	ND	104	86.2	83	104	87.0	84	1	38-118/25
98-95-3	Nitrobenzene	ND	104	94.9	91	104	88.8	85	7	35-130/25
621-64-7	N-Nitroso-di-n-propylamine	ND	104	92.0	88	104	84.5	81	8	45-123/22
86-30-6	N-Nitrosodiphenylamine	ND	104	85.6	82	104	83.2	80	3	46-123/24
85-01-8	Phenanthrene	ND	104	91.5	88	104	87.7	84	4	48-121/23
129-00-0	Pyrene	ND	104	90.2	87	104	88.8	85	2	43-124/26
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	104	89.2	86	104	84.6	81	5	25-142/24

CAS No.	Surrogate Recoveries	MS	MSD	JC34496-12	Limits
367-12-4	2-Fluorophenol	53%	54%	43%	14-88%

* = Outside of Control Limits.



Matrix Spike/Matrix Spike Duplicate Summary

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Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99618-MS2	6P33689.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
OP99618-MSD2	6P33690.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550
JC34496-12 ^a	6P33685.D	1	01/04/17	AC	01/03/17	OP99618	E6P1550

The QC reported here applies to the following samples:

Method: SW846 8270D

JC34496-12

CAS No.	Surrogate Recoveries	MS	MSD	JC34496-12	Limits
4165-62-2	Phenol-d5	37%	40%	29%	10-110%
118-79-6	2,4,6-Tribromophenol	84%	83%	81%	39-149%
4165-60-0	Nitrobenzene-d5	94%	87%	85%	32-128%
321-60-8	2-Fluorobiphenyl	83%	80%	75%	35-119%
1718-51-0	Terphenyl-d14	77%	79%	65%	10-126%

(a) Sample extracted outside the holding time per client's request.



* = Outside of Control Limits.

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JC34496

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Matrix Spike/Matrix Spike Duplicate Summary

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Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99618A-MS2	4M69457.D	1	01/05/17	SG	01/03/17	OP99618A	E4M3187
OP99618A-MSD2	4M69458.D	1	01/05/17	SG	01/03/17	OP99618A	E4M3187
JC34496-12 ^a	4M69461.D	1	01/05/17	SG	01/03/17	OP99618A	E4M3187

The QC reported here applies to the following samples:

Method: SW846 8270D BY SIM

JC34496-12

CAS No.	Compound	JC34496-12 ug/l	Spike Q	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
56-55-3	Benzo(a)anthracene	ND	2	1.72	86	2	1.66	83	4	25-135/33
50-32-8	Benzo(a)pyrene	ND	2	1.47	74	2	1.37	69	7	10-116/38
205-99-2	Benzo(b)fluoranthene	ND	2	1.56	78	2	1.47	74	6	10-131/40
207-08-9	Benzo(k)fluoranthene	ND	2	1.55	78	2	1.42	71	9	10-120/45
218-01-9	Chrysene	ND	2	1.58	79	2	1.52	76	4	31-125/33
53-70-3	Dibenzo(a,h)anthracene	ND	2	1.29	65	2	1.17	59	10	10-116/48
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2	1.32	66	2	1.18	59	11	10-116/48
91-20-3	Naphthalene	ND	2	1.63	82	2	1.50	75	8	23-140/36
123-91-1	1,4-Dioxane	0.572	2	1.51	47	2	1.56	49	3	20-160/30

CAS No.	Surrogate Recoveries	MS	MSD	JC34496-12	Limits
367-12-4	2-Fluorophenol	52%	56%		14-81%
4165-62-2	Phenol-d5	33%	35%		11-54%
118-79-6	2,4,6-Tribromophenol	82%	86%		35-145%
4165-60-0	Nitrobenzene-d5	77%	83%	77%	24-125%
321-60-8	2-Fluorobiphenyl	74%	76%	72%	19-127%
1718-51-0	Terphenyl-d14	74%	73%	61%	10-119%

(a) Sample extracted outside holding time per client's request. There is compound in BS was outside in house QC limits. The results confirmed by reextraction.



* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: JC34496

Account: AMANYWP Anderson, Mulholland & Associates

Project: BSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC34496-12MS	GH108019.D	1	01/03/17	XPL	n/a	n/a	GGH5601
JC34496-12MSD	GH108020.D	1	01/03/17	XPL	n/a	n/a	GGH5601
JC34496-12	GH108018.D	1	01/03/17	XPL	n/a	n/a	GGH5601

The QC reported here applies to the following samples:

Method: SW846-8015C (DAI)

JC34496-1, JC34496-2, JC34496-3, JC34496-4, JC34496-7, JC34496-9, JC34496-10, JC34496-12

CAS No.	Compound	JC34496-12 ug/l	Spike Q	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	ND	5000	5030	101	5000	5600	112	11	58-145/27
78-83-1	Isobutyl Alcohol	ND	5000	4430	89	5000	5000	100	12	69-131/25
67-63-0	Isopropyl Alcohol	ND	5000	4890	98	5000	5410	108	10	70-133/28
71-23-8	n-Propyl Alcohol	ND	5000	5090	102	5000	5270	105	3	66-137/29
71-36-3	n-Butyl Alcohol	ND	5000	5920	118	5000	4890	98	19	63-131/25
78-92-2	sec-Butyl Alcohol	ND	5000	5260	105	5000	5750	115	9	64-136/25
67-56-1	Methanol	ND	5000	4720	94	5000	5340	107	12	48-148/34

CAS No.	Surrogate Recoveries	MS	MSD	JC34496-12	Limits
111-27-3	Hexanol	100%	102%	107%	56-145%
111-27-3	Hexanol	83%	84%	84%	56-145%



* = Outside of Control Limits.

CHAIN OF CUSTODY

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JC34496: Chain of Custody
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2335 Route 130, Dayton, NJ 08810
TEL: 732-329-0280 FAX: 732-329-3490
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FEDEX Tracking # 7780 3769 6555
SGS Account Order # JC34496
SGS Order Control #

CW FB, EB, DTB

Client/Reporting Information		Project Information		Requested Analysis (see TEST CODE sheet)		Matrix Codes	
Company Name Anderson Mutholand & Associates		Project Name 4th Q 2016 Groundwater Sampling - Onsite Wells					
Street Address 2700 Westchester Avenue, Suite 417		Street 4th Q 2016 Groundwater Sampling - Onsite Wells					
City, State, Zip City: NY, State: NY, Zip: 10577		City, State, Zip City: Humacao, State: PR, Zip: 00877					
Purchase Order # 914-251-0400		Client Purchase Order #					
Project Contact Terry Taylor		Project #					
Phone # 914-251-0400		Fax #					
Sample Name(s)		Project Manager Terry Taylor					
Phone #		Attention					
Field ID / Point of Collection		Date		Time		Sampled by	
1 MW-20S		12-22-16		1311		RS GW	
2 FB 122216		12-22-16		1420		RS FB	
3 MW-20D		12-22-16		1522		RS GW	
4 RA-10S		12-22-16		1604		NR GW	
5 TB 122216 NR		12-22-16		1604		TB	
6 TB 122216 RS		12-22-16		1522		TB	
7 FB 122316		12-23-16		1028		NR FB	
8 S-40D		12-23-16		1210		NR GW	
9 FB 122316		12-23-16		1514		RS FB	
10 MW-19		12-23-16		1458		NR GW	
11 TB 122316 NR		12-23-16		1458		TB	
Turnaround Time (Business days)		Data Deliverable Information		Comments / Special Instructions		WET CHEMISTRY INCLUDES ALK, XFE3, MN, VRSK175CH4, XNO30, SO4, AND S	
<input checked="" type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> Other		Approved By (SGS Account Rep): INITIAL ASSESSMENT LABEL VERIFICATION		<input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input checked="" type="checkbox"/> FULLY (Level 3-4) <input type="checkbox"/> NJ Reduced <input type="checkbox"/> Commercial "E" <input type="checkbox"/> NJ Data of Known Quality Protocol Reporting Commercial "A" = Results Only Commercial "B" = Results + QC Summary NJ Reduced = Results + QC Summary + Partial Raw data		<input type="checkbox"/> NYASP Category A <input type="checkbox"/> NYASP Category B <input type="checkbox"/> State Forms <input type="checkbox"/> EDD Format <input type="checkbox"/> Other	
Emergency & Rush TAA date available via lab only		Sample Custody must be documented below each time samples change possession, including courier delivery.		Sample inventory is verified upon receipt in the Laboratory.			
Received by: <i>Yatin M. Rivera</i>		Date Time: 12/27/16 11:15		Received By: <i>FEDEX</i>		Date Time: 10:30 12/29/16	
Received by: <i>3</i>		Date Time:		Received By: <i>4</i>		Date Time:	
Received by: <i>5</i>		Date Time:		Received By: <i>5</i>		Date Time:	
Continuity Seal #		587-590		Preserved where: <i>1.3</i>		On Ice: <i>1.3</i> Cooler Temp: <i>41.15</i>	

JC34496: Chain of Custody

Page 1 of 4

EXECUTIVE NARRATIVE

SDG No: **JC34496** Laboratory: **Accutest, New Jersey**
Analysis: **SW846-8260C** Number of Samples: **15**
Location: **BMSMC, Building 5 Area**
4TH Q 2016 Groundwater Sampling-Onsite Wells
Humacao, PR

SUMMARY: Fifteen (15) samples were analyzed for selected VOAs of the TCL list (1,3-butadiene) by method SW846-8260C. Samples were validated following USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: **None**
Major: **None**
Minor: **None**

Critical findings: **None**
Major findings: **None**
Minor findings: **None**

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: **Rafael Infante**
Chemist License 1888

Signature:

A handwritten signature in blue ink, appearing to read 'Rafael Infante', is written over a horizontal line.

Date: **February 1, 2017**

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC34496-1

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-2

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: AQ - Field Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-3

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-4

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-5

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: AQ - Trip Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-6

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: AQ - Trip Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-7

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: AQ - Equipment Blank

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-8

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-9

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: AQ - Field Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-10

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-11

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: AQ - Trip Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-12

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-13

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: AQ - Trip Blank Water

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC34496-12MS

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	29.5	ug/l	1	-	-	Yes

Sample ID: JC34496-12MSD

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	30.3	ug/l	1	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number: JC34496
 Date: December 22-23, 2016
 Shipping date: December 27, 2016
 EPA Region: 2

REVIEW OF VOLATILE ORGANIC PACKAGE Low/Medium Volatile Data Validation

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: JC34496 Sample matrix: Groundwater
 No. of Samples: 15
 Trip blank No.: JC34496-5; JC34496-6; JC34496-11; JC34496-13
 Field blank No.: JC34496-2; JC34496-9
 Equipment blank No.: JC34496-7
 Field duplicate No.: _____

<input checked="" type="checkbox"/> Data Completeness	<input checked="" type="checkbox"/> Laboratory Control Spikes
<input checked="" type="checkbox"/> Holding Times	<input checked="" type="checkbox"/> Field Duplicates
<input checked="" type="checkbox"/> GC/MS Tuning	<input checked="" type="checkbox"/> Calibrations
<input checked="" type="checkbox"/> Internal Standard Performance	<input checked="" type="checkbox"/> Compound Identifications
<input checked="" type="checkbox"/> Blanks	<input checked="" type="checkbox"/> Compound Quantitation
<input checked="" type="checkbox"/> Surrogate Recoveries	<input checked="" type="checkbox"/> Quantitation Limits
<input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate	

Overall Comments: Selected VOA (1,3-Butadiene) from the TCL list (SW846_8260C)
4TH_Q_2016_Groundwater_Sampling-Onsite_Wells

Definition of Qualifiers:

J- Estimated results
 U- Compound not detected
 R- Rejected data
 UJ- Estimated nondetect

Reviewer: _____
 Date: February 1, 2017

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION

DATE LAB. CONTACTED

DATE RECEIVED

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. A dashed diagonal line runs across the page from the upper left corner towards the lower right corner. The lines are evenly spaced and extend across the width of the page.

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met _____
and/or see below _____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within method recommended holding time. Samples properly preserved.				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples ($\text{pH} \leq 2$, $4 \pm 2^\circ\text{C}$), no air bubbles.

Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C , no air bubbles.

Soil samples- 14 days from sample collection.

Cooler temperature (Criteria: $4 \pm 2^\circ\text{C}$): 5.5°C - OK

Actions

Aqueous samples

- If there is no evidence that the samples were properly preserved ($\text{pH} < 2$, $T = 4^\circ\text{C} \pm 2^\circ\text{C}$), but the samples were analyzed within the technical holding time [7 days from sample collection], no qualification of the data is necessary.
- If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [7 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
- If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
- If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).
- If air bubbles were present in the sample vial used for analysis, qualify detected compounds as estimated (J-) and non-detected compounds as estimated (UJ).

Non-aqueous samples

- If there is no evidence that the samples were properly preserved ($T < -7^\circ\text{C}$ or $T = 4^\circ\text{C} \pm 2^\circ\text{C}$ and preserved with NaHSO_4), but the samples were analyzed within the technical holding time [14 days

DATA REVIEW WORKSHEETS

from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as (UJ) or unusable (R) using professional judgment.

b. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.

c. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [14 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).

d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).

Qualify TCLP/SPLP samples

a. If the TCLP/SPLP ZHE procedure is performed within the extraction technical holding time of 14 days, detects and non-detects should not be qualified.

b. If the TCLP/SPLP ZHE procedure is performed outside the extraction technical holding time of 14 days, qualify detects as estimated (J) and non-detects as unusable (R).

c. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed within the technical holding time of 7 days, detects and non-detects should not be qualified.

d. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed outside of the technical holding time of 7 days, qualify detects as estimated (J) and non-detects as unusable (R).

DATA REVIEW WORKSHEETS

Table 1. Holding Time Actions for Low/Medium Volatile Analyses - Summary

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days	No qualification	
	No	> 7 days	J	R
	Yes	≤ 14 days	No qualification	
	Yes	> 14 days	J	R
Non-Aqueous	No	≤ 14 days	J	Professional judgment, UJ or R
	Yes	≤ 14 days	No qualification	
	Yes/No	> 14 days	J	R
TCLP/SPLP	Yes	≤ 14 days	No qualification	
TCLP/SPLP	No	> 14 days	J	R

TCLP/SPLP	ZHE performed within the 14-day technical holding time	No qualification	
TCLP/SPLP	ZHE performed outside the 14-day technical holding time	J	R
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed within 7 days	No qualification	
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed outside 7 days	J	R
Sample temperature outside 4°C ± 2°C upon receipt at the laboratory		Use professional judgment	
Holding times grossly exceeded		J	R

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met see below

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

 X The BFB performance results were reviewed and found to be within the specified criteria.

 X BFB tuning was performed for every 12 hours of sample analysis.

NOTES: All mass spectrometer instrument conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the method specifications are contrary to the Quality Assurance (QA) objectives, and are therefore unacceptable.

NOTES: No data should be qualified based on BFB failure. Instances of this should be noted in the narrative.

All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

Actions:

If samples are analyzed without a preceding valid instrument performance check, qualify all data in those samples as unusable (R).

If ion abundance criteria are not met, professional judgment may be applied to determine to what extent the data may be utilized. When applying professional judgment to this topic, the most important factors to consider are the empirical results that are relatively insensitive to location on the chromatographic profile and the type of instrumentation. Therefore, the critical ion abundance criteria for BFB are the m/z 95/96, 174/572, 174/176, and 176/177 ratios. The relative abundances of m/z 50 and 75 are of lower importance. This issue is more critical for Tentatively Identified Compounds (TICs) than for target analytes.

Note: State in the Data Review Narrative, decisions to use analytical data associated with BFB instrument performance checks not meeting contract requirements.

Note: Verify that that instrument instrument performance check criteria were achieved using techniques described in Low/Medium Volatiles Organic Analysis, Section II.D.5 of the SOM02.2 NFG, obtain additional information on the instrument performance checks. Make sure that background subtraction was performed from the BFB peak and not from background subtracting from the solvent front or from another region of the chromatogram.

DATA REVIEW WORKSHEETS

Use professional judgment to determine whether associated data should be qualified based on the spectrum of the mass calibration compound.

List the samples affected:

If mass calibration is in error, all associated data are rejected.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below _____

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 12/08/16
 Dates of continuing (initial) calibration: 12/08/16
 Dates of continuing calibration: 01/03/17; 01/04/17; 01/05/17; 01/06/17
 Dates of ending calibration: _____
 Instrument ID numbers: GCMS4B
 Matrix/Level: Aqueous/low

DATE	LAB ID#	FILE	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED

Note: Initial calibration, initial calibration verification, and continuing calibration verification within the method and validation guidance document required performance criteria. Closing calibration check verification not included in data package. No action taken, professional judgment.

Criteria

The analyte calibration criteria in the following Table must be obtained. Analytes not meeting the criteria are qualified.

A separate worksheet should be filled for each initial curve

DATA REVIEW WORKSHEETS

Initial Calibration - Table 2. RRF, %RSD, and %D Acceptance Criteria for Initial Calibration and CCV for Low/Medium Volatile Analysis

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Closing Maximum %D
Dichlorodifluoromethane	0.010	25.0	±40.0	±50.0
Chloromethane	0.010	20.0	±30.0	±50.0
Vinyl chloride	0.010	20.0	±25.0	±50.0
Bromomethane	0.010	40.0	±30.0	±50.0
Chloroethane	0.010	40.0	±25.0	±50.0
Trichlorofluoromethane	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene	0.060	20.0	±20.0	±25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	25.0	±25.0	±50.0
Acetone	0.010	40.0	±40.0	±50.0
Carbon disulfide	0.100	20.0	±25.0	±25.0
Methyl acetate	0.010	40.0	±40.0	±50.0
Methylene chloride	0.010	40.0	±30.0	±50.0
trans-1,2-Dichloroethene	0.100	20.0	±20.0	±25.0
Methyl tert-butyl ether	0.100	40.0	±25.0	±50.0
1,1-Dichloroethane	0.300	20.0	±20.0	±25.0
cis-1,2-Dichloroethene	0.200	20.0	±20.0	±25.0
2-Butanone	0.010	40.0	±40.0	±50.0
Bromochloromethane	0.100	20.0	±20.0	±25.0
Chloroform	0.300	20.0	±20.0	±25.0
1,1,1-Trichloroethane	0.050	20.0	±25.0	±25.0
Cyclohexane	0.010	40.0	±25.0	±50.0
Carbon tetrachloride	0.100	20.0	±25.0	±25.0
Benzene	0.200	20.0	±20.0	±25.0
1,2-Dichloroethane	0.070	20.0	±20.0	±25.0
Trichloroethene	0.200	20.0	±20.0	±25.0
Methylcyclohexane	0.050	40.0	±25.0	±50.0
1,2-Dichloropropane	0.200	20.0	±20.0	±25.0
Bromodichloromethane	0.300	20.0	±20.0	±25.0
cis-1,3-Dichloropropene	0.300	20.0	±20.0	±25.0
4-Methyl-2-pentanone	0.030	25.0	±30.0	±50.0
Toluene	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene	0.200	20.0	±20.0	±25.0
1,1,2-Trichloroethane	0.200	20.0	±20.0	±25.0
Tetrachloroethene	0.100	20.0	±20.0	±25.0
2-Hexanone	0.010	40.0	±40.0	±50.0
Dibromochloromethane	0.200	20.0	±20.0	±25.0
1,2-Dibromoethane	0.200	20.0	±20.0	±25.0
Chlorobenzene	0.400	20.0	±20.0	±25.0
Ethylbenzene	0.400	20.0	±20.0	±25.0

DATA REVIEW WORKSHEETS

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Closing Maximum
m,p-Xylene	0.200	20.0	±20.0	±25.0
o-Xylene	0.200	20.0	±20.0	±25.0
Styrene	0.200	20.0	±20.0	±25.0
Bromoform	0.100	20.0	±25.0	±50.0
Isopropylbenzene	0.400	20.0	±25.0	±25.0
1,1,2,2-Tetrachloroethane	0.200	20.0	±25.0	±25.0
1,3-Dichlorobenzene	0.500	20.0	±20.0	±25.0
1,4-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dibromo-3-chloropropane	0.010	25.0	±30.0	±50.0
1,2,4-Trichlorobenzene	0.400	20.0	±30.0	±50.0
1,2,3-Trichlorobenzene	0.400	25.0	±30.0	±50.0
Deuterated Monitoring Compound				
Vinyl chloride-d ₃	0.010	20.0	±30.0	±50.0
Chloroethane-d ₅	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene-d ₂	0.050	20.0	±25.0	±25.0
2-Butanone-d ₅	0.010	40.0	±40.0	±50.0
Chloroform-d	0.300	20.0	±20.0	±25.0
1,2-Dichloroethane-d ₄	0.060	20.0	±25.0	±25.0
Benzene-d ₆	0.300	20.0	±20.0	±25.0
1,2-Dichloropropane-d ₆	0.200	20.0	±20.0	±25.0
Toluene-d ₈	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene-d ₄	0.200	20.0	±20.0	±25.0
2-Hexanone-d ₅	0.010	40.0	±40.0	±50.0
1,1,2,2-Tetrachloroethane-d ₂	0.200	20.0	±25.0	±25.0
1,2-Dichlorobenzene-d ₄	0.400	20.0	±20.0	±25.0

- ¹ If a closing CCV is acting as an opening CCV, all target analytes and DMCs must meet the requirements for an opening CCV.

Actions:

1. If any volatile target compound has an RRF value less than the minimum in the table, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J+ or R).
 - a. If any volatile target compound has an RRF value less than the minimum criterion, qualify non-detected compounds as unusable (R).
 - b. If any of the volatile target compounds listed in the Table has %RSD greater than the criteria, qualify detects as estimated (J), and non-detected compounds using professional judgment.
 - c. If the volatile target compounds meet the acceptance criteria for RRF and the %RSD, no qualification of the data is necessary.

DATA REVIEW WORKSHEETS

- d. No qualification of the data is necessary on the DMC RRF and %RSD data alone. Use professional judgment and follow the guidelines in Action 2 to evaluate the DMC RRF and %RSD data in conjunction with the DMC recoveries to determine the need for qualification of data.
2. At the reviewer's discretion, and based on the project-specific Data Quality Objectives (DQOs), a more in-depth review may be considered using the following guidelines:
 - a. If any volatile target compound has a %RSD greater than the maximum criterion in the Table, and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:
 - i. Qualify detects for that compound(s) as estimated (J).
 - ii. Qualify non-detected volatile target compounds using professional judgment.
 - b. If the high-point of the curve is outside of the linearity criteria (e.g., due to saturation):
 - i. Qualify detects outside of the linear portion of the curve as estimated (J).
 - ii. No qualifiers are required for detects in the linear portion of the curve.
 - iii. No qualifiers are required for volatile target compounds that were not detected.
 - c. If the low-point of the curve is outside of the linearity criteria:
 - i. Qualify low-level detects in the area of non-linearity as estimated (J).
 - ii. No qualifiers are required for detects in the linear portion of the curve.
 - iii. For non-detected volatile compounds, use the lowest point of the linear portion of the curve to determine the new quantitation limit.

Note: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for the Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Initial Calibration Actions for Low/Medium Volatile Analysis – Summary

Criteria	Action	
	Detect	Non-detect
Initial Calibration not performed at specified frequency and sequence	Use professional judgment R	Use professional judgment R
Initial Calibration not performed at the specified concentrations	J	UJ
RRF < Minimum RRF in Table for target analyte	Use professional judgment J+ or R	R
RRF > Minimum RRF in Table for target analyte	No qualification	No qualification
%RSD > Maximum %RSD in Table for target analyte	J	Use professional judgment
%RSD ≤ Maximum %RSD in Table for target analyte	No qualification	No qualification

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

Continuing Calibration Verification (CCV)

NOTE: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analytical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see criteria show before in the Table) . If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

All DMCs must meet RRF criteria. No qualification of the data is necessary on the DMCs RRF and %RSD/%D data alone. However, use professional judgment to evaluate the DMC and %RSD/%D data in conjunction with the DMC recoveries to determine the need of qualification the data.

Action:

1. If a CCV (opening and closing) was not run at the appropriate frequency, qualify data using professional judgment.
2. Qualify all volatile target compounds in Table shown before using the following criteria:
 - a. For an opening CCV, if any volatile target compound has an RRF value less than the minimum criterion, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J) and qualify non-detected compounds as unusable (R).
 - b. For a closing CCV, if any volatile target compound has an RRF value less than the criteria, use professional judgment for detects based on mass spectral identification to qualify the data as estimated (J), and qualify non-detected compounds as unusable (R).
 - c. For an opening CCV, if the Percent Difference value for any of the volatile target compounds is outside the limits in calibration criteria Table shown before, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
 - d. For a closing CCV, if the Percent Difference value for any volatile target compound is outside the limits in calibration criteria table, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
 - e. If the volatile target compounds meet the acceptable criteria for RRF and the Percent Difference, no qualification of the data is necessary.

DATA REVIEW WORKSHEETS

- f. No qualification of the data is necessary on the DMC RRF and the Percent Difference data alone. Use professional judgment to evaluate the DMC RRF and Percent Difference data in conjunction with the DMC recoveries to determine the need for qualification of data.

Notes: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for Contract Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Continuing Calibration Actions for Low/Medium Volatile Analysis – Summary

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detect	Non-detect
CCV not performed at required frequency	CCV not performed at required frequency	Use professional judgment R	Use professional judgment R
CCV not performed at specified concentration	CCV not performed at specified concentration	Use professional judgment	Use professional judgment
RRF < Minimum RRF in Table 2 for target analyte	RRF < Minimum RRF in Table for target analyte	Use professional judgment J or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	RRF ≥ Minimum RRF in Table for target analyte	No qualification	No qualification
%D outside the Opening Maximum %D limits in Table 2 for target analyte	%D outside the Closing Maximum %D limits in Table for target analyte	J	UJ
%D within the inclusive Opening Maximum %D limits in Table 2 for target analyte	%D within the inclusive Closing Maximum %D limits in Table for target analyte	No qualification	No qualification

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

The concentration of a target analyte in any blank must not exceed its Contract Required Quantitation Limit (CRQL) (2x CRQLs for Methylene chloride, Acetone, and 2-Butanone). TIC concentration in any blanks must be ≤ 5.0 $\mu\text{g/L}$ for water (0.0050 mg/L for TCLP leachate) and ≤ 5.0 $\mu\text{g/kg}$ for soil matrices.

Laboratory blanks

The method blank, like any other sample in the SDG, must meet the technical acceptance criteria for sample analysis.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analyte detected in method blanks.				

Field/Equipment/Trip blank

If field or trip blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analytes detected in the field/trip/equipment blanks associated with this data package.				

DATA REVIEW WORKSHEETS

All criteria were met ☒ X
 Criteria were not met
 and/or see below _____

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Note: All fields blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks and trip blanks must be qualified for system monitoring compounds, instrument performance criteria, and spectral or calibration QC problems.

Samples taken from a drinking water tap do not have associated field blanks.

When applied as described in the Table below, the contaminant concentration in the blank is multiplied by the sample dilution factor.

Table. Blank and TCLP/SPLP LEB Actions for Low/Medium Volatile Analysis

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Storage, Field, Trip, TCLP/SPLP LEB. Instrument**	Detects	Not detected	No qualification required
	< CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL*	No qualification required
	> CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL* and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL* and > blank concentration	No qualification required
	= CRQL*	≤ CRQL*	Report CRQL value with a U
		> CRQL*	No qualification required
	Gross contamination	Detects	Report blank value for sample concentration with a U

* 2x the CRQL for methylene chloride, 2-butanone and acetone.

** Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 µg/L.

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

DATA REVIEW WORKSHEETS

Notes:

High and low level blanks must be treated separately

Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike (DMCs) recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

Table. Volatile Deuterated Monitoring Compounds (DMCs) and Recovery Limits

DMC	%R for Water Sample	%R for Soil Sample
Vinyl chloride-d3	60-135	30-150
Chloroethane-d5	70-130	30-150
1,1-Dichloroethene-d2	60-125	45-110
2-Butanone-d5	40-130	20-135
Chloroform-d	70-125	40-150
1,2-Dichloroethane-d4	70-125	70-130
Benzene-d6	70-125	20-135
1,2-Dichloropropane-d6	70-120	70-120
Toluene-d8	80-120	30-130
trans-1,3-Dichloropropene-d4	60-125	30-135
2-Hexanone-d5	45-130	20-135
1,1,2,2-Tetrachloroethane-d2	65-120	45-120
1,2-Dichlorobenzene-d4	80-120	75-120

NOTE: The recovery limits for any of the compounds listed in the above Table may be expanded at any time during the period of performance if the United States Environmental Protection Agency (EPA) determines that the limits are too restrictive.

Action:

Are recoveries for DMCs in volatile samples and blanks must be within the limits specified in the Table above. Yes? or No?

NOTE: The recovery limits for any of the compounds listed in the Table above may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

DATA REVIEW WORKSHEETS

List the DMCs that may fail to meet the recovery limits

Sample ID	Date	DMCs	% Recovery	Action
-----------	------	------	------------	--------

Note: DMCs recoveries within the required limits and within the guidance document performance criteria (80 – 120). Other non-deuterated surrogates added to the samples, % recoveries within laboratory control limits.

Note: Any sample which has more than 3 DMCs outside the limits must be reanalyzed.

Action:

1. For any recovery greater than the upper acceptance limit:
 - a. Qualify detected associated volatile target compounds as estimated high (J+).
 - b. Do not qualify non-detected associated volatile target compounds.
2. For any recovery greater than or equal to 10%, and less than the lower acceptance limit:
 - a. Qualify detected associated volatile target compounds as estimated low (J-).
 - b. Qualify non-detected associated volatile target compounds as estimated (UJ).
3. For any recovery less than 10%:
 - a. Qualify detected associated volatile target compounds as estimated low (J-).
 - b. Qualify non-detected associated volatile target compounds as unusable (R).
4. For any recovery within acceptance limits, no qualification of the data is necessary.
5. In the special case of a blank analysis having DMCs out of specification, the reviewer must give special consideration to the validity of associated sample data. The basic concern is whether the blank problems represent an isolated problem with the blank alone, or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence. However, even if this judgment allows some use of the affected data, note analytical problems for Contract Laboratory COR action.
6. If more than three DMCs are outside of the recovery limits for Low/Medium volatiles analysis and the sample was not reanalyzed, note under Contract Problems/Non-Compliance.

Table. Deuterated Monitoring Compound (DMC) Recovery Actions for Low/Medium Volatiles Analyses – Summary

Criteria	Action	
	Detect Associated Compounds	Non-detected Associated Compounds
%R < 10%	J-	R
10% ≤ %R < Lower Acceptance Limit	J-	UJ
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

DATA REVIEW WORKSHEETS

TABLE. VOLATILE DEUTERATED MONITORING COMPOUNDS (DMCs) AND THE ASSOCIATED TARGET COMPOUNDS

Vinyl chloride-d₃ (DMC-1)	Chloroethane-d₅ (DMC-2)	1,1-Dichloroethene-d₂ (DMC-3)
Vinyl chloride	Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon disulfide	trans-1,2-Dichloroethene cis-1,2-Dichloroethene 1,1-Dichloroethene
2-Butanone-d₆ (DMC-4)	Chloroform-d (DMC-5)	1,2-Dichloroethane-d₄ (DMC-6)
Acetone 2-Butanone	1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl acetate Methylene chloride Methyl-tert-butyl ether 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dibromoethane 1,2-Dichloroethane
Benzene-d₆ (DMC-7)	1,2-Dichloropropane-d₆ (DMC-8)	Toluene-d₈ (DMC-9)
Benzene	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylene m,p-Xylene Styrene Isopropylbenzene
trans-1,3-Dichloropropene-d₄ (DMC-10)	2-Hexanone-d₈ (DMC-11)	1,1,2,2-Tetrachloroethane-d₂ (DMC-12)
cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	4-Methyl-2-pentanone 2-Hexanone	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene-d₄ (DMC-13)		
Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene		

DATA REVIEW WORKSHEETS

All criteria were met _____
 Criteria were not met _____
 and/or see below _____ X _____

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

NOTES: Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: JC34263-3MS _____	Matrix/Level: _____ Groundwater _____
Sample ID: JC34583-1MS _____	Matrix/Level: _____ Groundwater _____
Sample ID: JC34340-16MS/-16MSD _____	Matrix/Level: _____ Groundwater _____
Sample ID: JC34496-12MS/-12MSD _____	Matrix/Level: _____ Groundwater _____
Sample ID: JC34831-1MS/-1MSD _____	Matrix/Level: _____ Groundwater _____

The QC reported here applies to the following samples:
 JC34496-2, JC34496-3, JC34496-4

Method: SW846 8260C

	JC34263-3	Spike	MS	MS	
Compound	ug/l	Q	ug/l	%	Limits
1,3-Butadiene	ND		50	4.5	9* a 10-167

(a) Outside control limits due to matrix interference.

* = Outside of Control Limits.

Note: MS/MSD % recoveries and RPD within laboratory control limits except in the cases described in this document. No action taken, MS recovery results apply to the unspiked sample. Unspiked sample was from another job.

DATA REVIEW WORKSHEETS

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 – 130 %.

Actions:

1. No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD?

Yes or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
Recoveries (blank spike) within laboratory control limits. _____			

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs: JC34496-3/-3DUP

Matrix: Groundwater

Sample IDs: JC34583-4/-4DUP

Matrix: Groundwater

Field/laboratory duplicate samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. Use professional judgment to note large RPDs (> 50%) in the narrative.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Field/laboratory duplicate analyzed with this data package. PRD within required criteria, ≤ 50 % for target analytes detected at concentration > 5x the SQL.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions are suggested based on professional judgment:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met X
Criteria were not met
and/or see below _____

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION
Internal standard area counts within the required criteria for all samples.					

1. If an internal standard area count for a sample or blank is greater than 200.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table below):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
 - b. Do not qualify non-detected associated compounds.
2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).
 - b. Qualify non-detected associated compounds as unusable (R).
3. If an internal standard area count for a sample or blank is greater than or equal to 20.0%, and less than or equal to 200% of the area for the associated standard opening CCV or mid-point standard from initial calibration, no qualification of the data is necessary.
4. If an internal standard RT varies by more than 30.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.
5. If an internal standard RT varies by less than or equal to 30.0 seconds, no qualification of the data is necessary.

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

DATA REVIEW WORKSHEETS

6. If required internal standard compounds are not added to a sample or blank, qualify detects and non-detects as unusable (R).
7. If the required internal standard compound is not analyzed at the specified concentration in a sample or blank, use professional judgment to qualify detects and non-detects.

Table. Internal Standard Actions for Low/Medium Volatiles Analyses - Summary

Criteria	Action	
	Detected Associated Compounds*	Non-detected Associated Compounds*
Area counts > 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J-	No qualification
Area counts < 20% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J+	R
Area counts \geq 50% but \leq 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	
RT difference > 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	R **	R
RT difference \leq 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	

* For volatile compounds associated to each internal standard, see TABLE - VOLATILE TARGET ANALYTES, DEUTERATED MONITORING COMPOUNDS WITH ASSOCIATED INTERNAL STANDARDS FOR QUANTITATION in SOM02.2, Exhibit D, available at: <http://www.epa.gov/superfund/programs/clp/download/som/som22d.pdf>

** Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

TARGET COMPOUND IDENTIFICATION

Criteria:

Is the Relative Retention Times (RRTs) of reported compounds within ± 0.06 RRT units of the standard RRT [opening Continuing Calibration Verification (CCV) or mid-point standard from the initial calibration]. Yes? or No?

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
=====	=====	=====
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Mass spectra of the sample compound and a current laboratory-generated standard [i.e., the mass spectrum from the associated calibration standard (opening CCV or mid-point standard from initial calibration)] must match according to the following criteria:

- All ions present in the standard mass spectrum at a relative intensity greater than 10% must be present in the sample spectrum.
- The relative intensities of these ions must agree within $\pm 20\%$ between the standard and sample spectra (e.g., for an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30-70%).
- Ions present at greater than 10% in the sample mass spectrum, but not present in the standard spectrum, must be evaluated by a reviewer experienced in mass spectral interpretation.

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
=====	=====	=====
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DATA REVIEW WORKSHEETS

Action:

1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).
2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.
3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

List TICs

Sample ID	Compound	Sample ID	Compound
=====		=====	
_____		_____	
_____		_____	
_____		_____	
_____		_____	
_____		_____	

Action:

1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
2. General actions related to the review of TIC results are as follows:
 - a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
 - b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
3. In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene).

DATA REVIEW WORKSHEETS

- isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).
4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).
 5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
 6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
 7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
 8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met _____
 and/or see below _____

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

1. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
2. For non-aqueous samples, in the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table below).
3. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
4. Results between MDL and CRQL should be qualified as estimated "J".
5. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves are not reported.

Table. Percent Moisture Actions for Low/Medium Volatiles Analysis for Non-Aqueous Samples

Criteria	Action	
	Detected Associated Compounds	Non-detected Associated Compounds
% Moisture < 70.0	No qualification	
70.0 < % Moisture < 90.0	J	UJ
% Moisture > 90.0	J	R

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

Sample ID

JC34496-12 MS

1,3-butadiene

RF = 0.619

[] = (135409)(50)/(0.619)(233443) = 46.9 ppb Ok

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

B. Percent Solids

List samples which have $\geq 70\%$ solids

QUANTITATION LIMITS

A. Dilution performed

[illegible]

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

OTHER ISSUES

A. System Performance

List samples qualified based on the degradation of system performance during simple analysis:

Sample ID	Comments	Actions
	No degradation of system performance observed.	

Action:

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Inform the Contract Laboratory Program COR any action as a result of degradation of system performance which significantly affected the data.

B. Overall Assessment of Data

List samples qualified based on other issues:

Sample ID	Comments	Actions
	No additional issues observed that require qualification of the data. Results are valid and can be used for decision purposes.	

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

EXECUTIVE NARRATIVE

SDG No: JC34496 Laboratory: Accutest, New Jersey
Analysis: SW846-8270D Number of Samples: 10
Location: BMSMC, Building 5 Area
4th Q 2016 Groundwater Sampling-Onsite Wells
Humacao, PR

SUMMARY: Ten (10) samples were analyzed for selected SVOCs following method SW846-8270D and Selected PAHs and 1,4-Dioxane were also analyzed by SW846-8270D using the selective ion monitoring (SIM) technique. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: EPA Hazardous Waste Support Section, SOP HW-35A, July 2015 –Revision 0. Semivolatile Data Validation. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: None
Major: None
Minor: None

Critical findings: None
Major findings: None

Minor findings: 1. All samples extracted and analyzed within method recommended holding time except for the cases described in the Data Review Worksheet. Sample preservation was appropriate.

Samples JC34496-12, JC34496-12MS/JC34496-12MSD were extracted outside the method recommended holding time. Results were qualified as estimated (J or UJ) in affected samples.

2. Initial and continuing calibration verifications meet the method and guidance document required performance criteria except in the cases described in the Data Review Worksheet. Results for were qualified as estimated (J or UJ) in affected samples.


No closing calibration verification included in data package. No action taken, professional judgment.

QC samples were not validated.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature:
Date:


February 3, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC34496-1
Sample location: BMSMC Building 5 Area
Sampling date: 12/22/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.1	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.1	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.0	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.1	ug/l	1	-	U	Yes
2,4-Dinitrophenol	10	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.1	ug/l	1	-	U	Yes
2-Methylphenol	2.0	ug/l	1	-	U	Yes
3&4-Methylphenol	2.0	ug/l	1	-	U	Yes
2-Nitrophenol	5.1	ug/l	1	-	U	Yes
4-Nitrophenol	10	ug/l	1	-	U	Yes
Pentachlorophenol	4.1	ug/l	1	-	U	Yes
Phenol	2.0	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.1	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.1	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.1	ug/l	1	-	U	Yes
Acenaphthene	1.0	ug/l	1	-	U	Yes
Acenaphthylene	1.0	ug/l	1	-	U	Yes
Acetophenone	2.0	ug/l	1	-	U	Yes
Anthracene	1.0	ug/l	1	-	U	Yes
Atrazine	2.0	ug/l	1	-	U	Yes
Benzaldehyde	5.1	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.0	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.0	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.0	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.0	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.0	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.0	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.0	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.0	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.0	ug/l	1	-	U	Yes
4-Chloroaniline	5.1	ug/l	1	-	U	Yes
Carbazole	1.0	ug/l	1	-	U	Yes
Caprolactam	2.0	ug/l	1	-	U	Yes
Chrysene	1.0	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.0	ug/l	1	-	U	Yes

bis(2-Chloroethyl)ether	2.0	ug/l	1	-	U	Yes
bis(2-Chloroisopropyl)ether	2.0	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.0	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.0	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.0	ug/l	1	-	U	Yes
Dibenzofuran	5.1	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.0	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.0	ug/l	1	-	U	Yes
Diethyl phthalate	2.0	ug/l	1	-	U	Yes
Dimethyl phthalate	2.0	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.0	ug/l	1	-	U	Yes
Fluoranthene	1.0	ug/l	1	-	U	Yes
Fluorene	1.0	ug/l	1	-	U	Yes
Hexachlorobenzene	1.0	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.0	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	11	ug/l	1	-	U	Yes
Hexachloroethane	2.0	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	U	Yes
Isophorone	2.0	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Nitroaniline	5.1	ug/l	1	-	U	Yes
3-Nitroaniline	5.1	ug/l	1	-	U	Yes
4-Nitroaniline	5.1	ug/l	1	-	U	Yes
Nitrobenzene	2.0	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.0	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.1	ug/l	1	-	U	Yes
Phenanthrene	1.0	ug/l	1	-	U	Yes
Pyrene	1.0	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.0	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.051	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.051	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.10	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.10	ug/l	1	-	U	Yes
Chrysene	0.10	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.10	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.10	ug/l	1	-	U	Yes
Naphthalene	0.10	ug/l	1	-	U	Yes
1,4-Dioxane	1.61	ug/l	1	-	-	Yes

Sample ID: JC34496-2
Sample location: BMSMC Building 5 Area
Sampling date: 12/22/2016
Matrix: AQ - Field Blank Water

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.3	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.3	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.1	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.3	ug/l	1	-	U	Yes
2,4-Dinitrophenol	11	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.3	ug/l	1	-	U	Yes
2-Methylphenol	2.1	ug/l	1	-	U	Yes
3&4-Methylphenol	2.1	ug/l	1	-	U	Yes
2-Nitrophenol	5.3	ug/l	1	-	U	Yes
4-Nitrophenol	11	ug/l	1	-	U	Yes
Pentachlorophenol	4.3	ug/l	1	-	U	Yes
Phenol	2.1	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.3	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.3	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.3	ug/l	1	-	U	Yes
Acenaphthene	1.1	ug/l	1	-	U	Yes
Acenaphthylene	1.1	ug/l	1	-	U	Yes
Acetophenone	2.1	ug/l	1	-	U	Yes
Anthracene	1.1	ug/l	1	-	U	Yes
Atrazine	2.1	ug/l	1	-	U	Yes
Benzaldehyde	5.3	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.1	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.1	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.1	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.1	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.1	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.1	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.1	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.1	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.1	ug/l	1	-	U	Yes
4-Chloroaniline	5.3	ug/l	1	-	U	Yes
Carbazole	1.1	ug/l	1	-	U	Yes
Caprolactam	2.1	ug/l	1	-	U	Yes
Chrysene	1.1	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.1	ug/l	1	-	U	Yes
bis(2-Chloroethyl)ether	2.1	ug/l	1	-	U	Yes

bis(2-Chloroisopropyl)ether	2.1	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.1	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.1	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.1	ug/l	1	-	U	Yes
Dibenzofuran	5.3	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.1	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.1	ug/l	1	-	U	Yes
Diethyl phthalate	2.1	ug/l	1	-	U	Yes
Dimethyl phthalate	2.1	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.1	ug/l	1	-	U	Yes
Fluoranthene	1.1	ug/l	1	-	U	Yes
Fluorene	1.1	ug/l	1	-	U	Yes
Hexachlorobenzene	1.1	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.1	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	11	ug/l	1	-	U	Yes
Hexachloroethane	2.1	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	U	Yes
Isophorone	2.1	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Nitroaniline	5.3	ug/l	1	-	U	Yes
3-Nitroaniline	5.3	ug/l	1	-	U	Yes
4-Nitroaniline	5.3	ug/l	1	-	U	Yes
Nitrobenzene	2.1	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.1	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.3	ug/l	1	-	U	Yes
Phenanthrene	1.1	ug/l	1	-	U	Yes
Pyrene	1.1	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.1	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.053	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.053	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.11	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.11	ug/l	1	-	U	Yes
Chrysene	0.11	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.11	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.11	ug/l	1	-	U	Yes
Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	0.11	ug/l	1	-	U	Yes

Sample ID: JC34496-3
Sample location: BMSMC Building 5 Area
Sampling date: 12/22/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.1	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.1	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.0	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.1	ug/l	1	-	U	Yes
2,4-Dinitrophenol	10	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.1	ug/l	1	-	U	Yes
2-Methylphenol	2.0	ug/l	1	-	U	Yes
3&4-Methylphenol	2.0	ug/l	1	-	U	Yes
2-Nitrophenol	5.1	ug/l	1	-	U	Yes
4-Nitrophenol	10	ug/l	1	-	U	Yes
Pentachlorophenol	4.0	ug/l	1	-	U	Yes
Phenol	2.0	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.1	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.1	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.1	ug/l	1	-	U	Yes
Acenaphthene	1.0	ug/l	1	-	U	Yes
Acenaphthylene	1.0	ug/l	1	-	U	Yes
Acetophenone	2.0	ug/l	1	-	U	Yes
Anthracene	1.0	ug/l	1	-	U	Yes
Atrazine	2.0	ug/l	1	-	U	Yes
Benzaldehyde	5.1	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.0	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.0	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.0	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.0	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.0	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.0	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.0	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.0	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.0	ug/l	1	-	U	Yes
4-Chloroaniline	5.1	ug/l	1	-	U	Yes
Carbazole	1.0	ug/l	1	-	U	Yes
Caprolactam	2.0	ug/l	1	-	U	Yes
Chrysene	1.0	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.0	ug/l	1	-	U	Yes
bis(2-Chloroethyl)ether	2.0	ug/l	1	-	U	Yes

bis(2-Chloroisopropyl)ether	2.0	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.0	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.0	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.0	ug/l	1	-	U	Yes
Dibenzofuran	5.1	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.0	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.0	ug/l	1	-	U	Yes
Diethyl phthalate	2.0	ug/l	1	-	U	Yes
Dimethyl phthalate	2.0	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.0	ug/l	1	-	U	Yes
Fluoranthene	1.0	ug/l	1	-	U	Yes
Fluorene	1.0	ug/l	1	-	U	Yes
Hexachlorobenzene	1.0	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.0	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	10	ug/l	1	-	U	Yes
Hexachloroethane	2.0	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	U	Yes
Isophorone	2.0	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Nitroaniline	5.1	ug/l	1	-	UJ ✓ /	Yes
3-Nitroaniline	5.1	ug/l	1	-	U	Yes
4-Nitroaniline	5.1	ug/l	1	-	U	Yes
Nitrobenzene	2.0	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.0	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.1	ug/l	1	-	U	Yes
Phenanthrene	1.0	ug/l	1	-	U	Yes
Pyrene	1.0	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.0	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.051	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.051	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.10	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.10	ug/l	1	-	U	Yes
Chrysene	0.10	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.10	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.10	ug/l	1	-	U	Yes
Naphthalene	0.10	ug/l	1	-	U	Yes
1,4-Dioxane	0.10	ug/l	1	-	U	Yes

Sample ID: JC34496-4
Sample location: BMSMC Building 5 Area
Sampling date: 12/22/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.6	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.6	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.2	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.6	ug/l	1	-	U	Yes
2,4-Dinitrophenol	11	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.6	ug/l	1	-	U	Yes
2-Methylphenol	2.2	ug/l	1	-	U	Yes
3&4-Methylphenol	2.2	ug/l	1	-	U	Yes
2-Nitrophenol	5.6	ug/l	1	-	U	Yes
4-Nitrophenol	11	ug/l	1	-	UJ ✓✓	Yes
Pentachlorophenol	4.4	ug/l	1	-	U	Yes
Phenol	2.2	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.6	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.6	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.6	ug/l	1	-	U	Yes
Acenaphthene	1.1	ug/l	1	-	U	Yes
Acenaphthylene	1.1	ug/l	1	-	U	Yes
Acetophenone	2.2	ug/l	1	-	U	Yes
Anthracene	1.1	ug/l	1	-	U	Yes
Atrazine	2.2	ug/l	1	-	U	Yes
Benzaldehyde	5.6	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.1	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.1	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.1	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.1	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.1	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.1	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.2	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.1	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.2	ug/l	1	-	U	Yes
4-Chloroaniline	5.6	ug/l	1	-	U	Yes
Carbazole	1.1	ug/l	1	-	U	Yes
Caprolactam	2.2	ug/l	1	-	U	Yes
Chrysene	1.1	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.2	ug/l	1	-	U	Yes

bis(2-Chloroethyl)ether	2.2	ug/l	1	-	U	Yes
bis(2-Chloroisopropyl)ether	2.2	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.2	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.2	ug/l	1	-	U	Yes
1,4-Dioxane	1290	ug/l	20	-	-	Yes
Dibenzo(a,h)anthracene	1.1	ug/l	1	-	U	Yes
Dibenzofuran	5.6	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.2	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.2	ug/l	1	-	U	Yes
Diethyl phthalate	2.2	ug/l	1	-	U	Yes
Dimethyl phthalate	2.2	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.2	ug/l	1	-	U	Yes
Fluoranthene	1.1	ug/l	1	-	U	Yes
Fluorene	1.1	ug/l	1	-	U	Yes
Hexachlorobenzene	1.1	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.1	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	11	ug/l	1	-	U	Yes
Hexachloroethane	2.2	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.1	ug/l	1	-	U	Yes
Isophorone	2.2	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Nitroaniline	5.6	ug/l	1	-	UJ	Yes
3-Nitroaniline	5.6	ug/l	1	-	U	Yes
4-Nitroaniline	5.6	ug/l	1	-	U	Yes
Nitrobenzene	2.2	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.2	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.6	ug/l	1	-	U	Yes
Phenanthrene	1.1	ug/l	1	-	U	Yes
Pyrene	1.1	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.2	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.056	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.056	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.11	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.11	ug/l	1	-	U	Yes
Chrysene	0.11	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.11	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.11	ug/l	1	-	U	Yes
Naphthalene	0.11	ug/l	1	-	-	Yes

Sample ID: JC34496-7
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: AQ - Equipment Blank

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.4	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.4	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.2	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.4	ug/l	1	-	U	Yes
2,4-Dinitrophenol	11	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.4	ug/l	1	-	U	Yes
2-Methylphenol	2.2	ug/l	1	-	U	Yes
3&4-Methylphenol	2.2	ug/l	1	-	U	Yes
2-Nitrophenol	5.4	ug/l	1	-	U	Yes
4-Nitrophenol	11	ug/l	1	-	U	Yes
Pentachlorophenol	4.3	ug/l	1	-	U	Yes
Phenol	2.2	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.4	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.4	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.4	ug/l	1	-	U	Yes
Acenaphthene	1.1	ug/l	1	-	U	Yes
Acenaphthylene	1.1	ug/l	1	-	U	Yes
Acetophenone	2.2	ug/l	1	-	U	Yes
Anthracene	1.1	ug/l	1	-	U	Yes
Atrazine	2.2	ug/l	1	-	U	Yes
Benzaldehyde	5.4	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.1	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.1	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.1	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.1	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.1	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.1	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.2	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.1	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.2	ug/l	1	-	U	Yes
4-Chloroaniline	5.4	ug/l	1	-	U	Yes
Carbazole	1.1	ug/l	1	-	U	Yes
Caprolactam	2.2	ug/l	1	-	U	Yes
Chrysene	1.1	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.2	ug/l	1	-	U	Yes

bis(2-Chloroethyl)ether	2.2	ug/l	1	-	U	Yes
bis(2-Chloroisopropyl)ether	2.2	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.2	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.2	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.1	ug/l	1	-	U	Yes
Dibenzofuran	5.4	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.2	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.2	ug/l	1	-	U	Yes
Diethyl phthalate	2.2	ug/l	1	-	U	Yes
Dimethyl phthalate	2.2	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.2	ug/l	1	-	U	Yes
Fluoranthene	1.1	ug/l	1	-	U	Yes
Fluorene	1.1	ug/l	1	-	U	Yes
Hexachlorobenzene	1.1	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.1	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	11	ug/l	1	-	U	Yes
Hexachloroethane	2.2	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.1	ug/l	1	-	U	Yes
Isophorone	2.2	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Nitroaniline	5.4	ug/l	1	-	U	Yes
3-Nitroaniline	5.4	ug/l	1	-	U	Yes
4-Nitroaniline	5.4	ug/l	1	-	U	Yes
Nitrobenzene	2.2	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.2	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.4	ug/l	1	-	U	Yes
Phenanthrene	1.1	ug/l	1	-	U	Yes
Pyrene	1.1	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.2	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.054	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.054	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.11	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.11	ug/l	1	-	U	Yes
Chrysene	0.11	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.11	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.11	ug/l	1	-	U	Yes
Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	0.11	ug/l	1	-	U	Yes

Sample ID: JC34496-9
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: AQ - Field Blank Water

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.0	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.0	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.0	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.0	ug/l	1	-	U	Yes
2,4-Dinitrophenol	10	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.0	ug/l	1	-	U	Yes
2-Methylphenol	2.0	ug/l	1	-	U	Yes
3&4-Methylphenol	2.0	ug/l	1	-	U	Yes
2-Nitrophenol	5.0	ug/l	1	-	U	Yes
4-Nitrophenol	10	ug/l	1	-	U	Yes
Pentachlorophenol	4.0	ug/l	1	-	U	Yes
Phenol	2.0	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.0	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.0	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.0	ug/l	1	-	U	Yes
Acenaphthene	1.0	ug/l	1	-	U	Yes
Acenaphthylene	1.0	ug/l	1	-	U	Yes
Acetophenone	2.0	ug/l	1	-	U	Yes
Anthracene	1.0	ug/l	1	-	U	Yes
Atrazine	2.0	ug/l	1	-	U	Yes
Benzaldehyde	5.0	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.0	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.0	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.0	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.0	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.0	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.0	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.0	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.0	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.0	ug/l	1	-	U	Yes
4-Chloroaniline	1.0	ug/l	1	-	U	Yes
Carbazole	1.0	ug/l	1	-	U	Yes
Caprolactam	1.2	ug/l	1	-	U	Yes
Chrysene	1.0	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.0	ug/l	1	-	U	Yes
bis(2-Chloroethyl)ether	2.0	ug/l	1	-	U	Yes

bis(2-Chloroisopropyl)ether	2.0	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.0	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.0	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.0	ug/l	1	-	U	Yes
Dibenzofuran	5.0	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.0	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.0	ug/l	1	-	U	Yes
Diethyl phthalate	2.0	ug/l	1	-	U	Yes
Dimethyl phthalate	2.0	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.0	ug/l	1	-	U	Yes
Fluoranthene	1.0	ug/l	1	-	U	Yes
Fluorene	1.0	ug/l	1	-	U	Yes
Hexachlorobenzene	1.0	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.0	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	10	ug/l	1	-	U	Yes
Hexachloroethane	2.0	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	U	Yes
Isophorone	2.0	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.0	ug/l	1	-	U	Yes
2-Nitroaniline	5.0	ug/l	1	-	U	Yes
3-Nitroaniline	5.0	ug/l	1	-	U	Yes
4-Nitroaniline	5.0	ug/l	1	-	U	Yes
Nitrobenzene	2.0	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.0	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.0	ug/l	1	-	U	Yes
Phenanthrene	1.0	ug/l	1	-	U	Yes
Pyrene	1.0	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.0	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.050	ug/l	1	-	U	Yes
Benzo(a)pyrene	0.050	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.10	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.10	ug/l	1	-	U	Yes
Chrysene	0.10	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.10	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.10	ug/l	1	-	U	Yes
Naphthalene	0.10	ug/l	1	-	U	Yes
1,4-Dioxane	0.10	ug/l	1	-	U	Yes

Sample ID: JC34496-10
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.1	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.1	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.1	ug/l	1	-	U	Yes
2,4-Dimethylphenol	8.5	ug/l	1	-	-	Yes
2,4-Dinitrophenol	10	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.1	ug/l	1	-	U	Yes
2-Methylphenol	2.1	ug/l	1	-	U	Yes
3&4-Methylphenol	2.1	ug/l	1	-	U	Yes
2-Nitrophenol	5.1	ug/l	1	-	U	Yes
4-Nitrophenol	10	ug/l	1	-	U	Yes
Pentachlorophenol	4.1	ug/l	1	-	U	Yes
Phenol	2.1	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.1	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.1	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.1	ug/l	1	-	U	Yes
Acenaphthene	1.0	ug/l	1	-	U	Yes
Acenaphthylene	1.0	ug/l	1	-	U	Yes
Acetophenone	2.4	ug/l	1	-	-	Yes
Anthracene	1.0	ug/l	1	-	U	Yes
Atrazine	2.1	ug/l	1	-	U	Yes
Benzaldehyde	5.1	ug/l	1	-	U	Yes
Benzo(a)anthracene	0.50	ug/l	1	J	J	Yes
Benzo(a)pyrene	1.0	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.0	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.0	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.0	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.0	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.1	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.0	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.1	ug/l	1	-	U	Yes
4-Chloroaniline	5.1	ug/l	1	-	U	Yes
Carbazole	1.0	ug/l	1	-	U	Yes
Caprolactam	2.1	ug/l	1	-	U	Yes
Chrysene	1.0	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.1	ug/l	1	-	U	Yes
bis(2-Chloroethyl)ether	2.1	ug/l	1	-	U	Yes

bis(2-Chloroisopropyl)ether	2.1	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.1	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.0	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.1	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.0	ug/l	1	-	U	Yes
Dibenzofuran	5.1	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.1	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.1	ug/l	1	-	U	Yes
Diethyl phthalate	2.1	ug/l	1	-	U	Yes
Dimethyl phthalate	2.1	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.1	ug/l	1	-	U	Yes
Fluoranthene	3.1	ug/l	1	-	-	Yes
Fluorene	1.0	ug/l	1	-	U	Yes
Hexachlorobenzene	1.0	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.0	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	10	ug/l	1	-	U	Yes
Hexachloroethane	2.1	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	U	Yes
Isophorone	2.1	ug/l	1	-	U	Yes
1-Methylnaphthalene	1.4	ug/l	1	-	-	Yes
2-Methylnaphthalene	1.4	ug/l	1	-	-	Yes
2-Nitroaniline	5.1	ug/l	1	-	U	Yes
3-Nitroaniline	5.1	ug/l	1	-	U	Yes
4-Nitroaniline	5.1	ug/l	1	-	U	Yes
Nitrobenzene	2.1	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.1	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.1	ug/l	1	-	U	Yes
Phenanthrene	0.53	ug/l	1	J	J	Yes
Pyrene	2.0	ug/l	1	-	-	Yes
1,2,4,5-Tetrachlorobenzene	2.1	ug/l	1	-	U	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.427	ug/l	1	-	-	Yes
Benzo(a)pyrene	0.051	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.10	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	0.10	ug/l	1	-	U	Yes
Chrysene	0.106	ug/l	1	-	-	Yes
Dibenzo(a,h)anthracene	0.10	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.10	ug/l	1	-	U	Yes
Naphthalene	1.51	ug/l	1	-	-	Yes
1,4-Dioxane	0.262	ug/l	1	-	-	Yes

Sample ID: JC34496-12
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.1	ug/l	1	-	UJ	Yes
4-Chloro-3-methyl phenol	5.1	ug/l	1	-	UJ	Yes
2,4-Dichlorophenol	2.0	ug/l	1	-	UJ	Yes
2,4-Dimethylphenol	5.1	ug/l	1	-	UJ	Yes
2,4-Dinitrophenol	10	ug/l	1	-	UJ	Yes
4,6-Dinitro-o-cresol	5.1	ug/l	1	-	UJ	Yes
2-Methylphenol	2.0	ug/l	1	-	UJ	Yes
3&4-Methylphenol	2.0	ug/l	1	-	UJ	Yes
2-Nitrophenol	5.1	ug/l	1	-	UJ	Yes
4-Nitrophenol	10	ug/l	1	-	UJ	Yes
Pentachlorophenol	4.0	ug/l	1	-	UJ	Yes
Phenol	2.0	ug/l	1	-	UJ	Yes
2,3,4,6-Tetrachlorophenol	5.1	ug/l	1	-	UJ	Yes
2,4,5-Trichlorophenol	5.1	ug/l	1	-	UJ	Yes
2,4,6-Trichlorophenol	5.1	ug/l	1	-	UJ	Yes
Acenaphthene	1.0	ug/l	1	-	UJ	Yes
Acenaphthylene	1.0	ug/l	1	-	UJ	Yes
Acetophenone	2.0	ug/l	1	-	UJ	Yes
Anthracene	1.0	ug/l	1	-	UJ	Yes
Atrazine	2.0	ug/l	1	-	UJ	Yes
Benzaldehyde	5.1	ug/l	1	-	UJ	Yes
Benzo(a)anthracene	1.0	ug/l	1	-	UJ	Yes
Benzo(a)pyrene	1.0	ug/l	1	-	UJ	Yes
Benzo(b)fluoranthene	1.0	ug/l	1	-	UJ	Yes
Benzo(g,h,i)perylene	1.0	ug/l	1	-	UJ	Yes
Benzo(k)fluoranthene	1.0	ug/l	1	-	UJ	Yes
4-Bromophenyl phenyl ether	1.0	ug/l	1	-	UJ	Yes
Butyl benzyl phthalate	2.0	ug/l	1	-	UJ	Yes
1,1'-Biphenyl	1.0	ug/l	1	-	UJ	Yes
2-Chloronaphthalene	2.0	ug/l	1	-	UJ	Yes
4-Chloroaniline	5.1	ug/l	1	-	UJ	Yes
Carbazole	1.0	ug/l	1	-	UJ	Yes
Caprolactam	2.0	ug/l	1	-	UJ	Yes
Chrysene	1.0	ug/l	1	-	UJ	Yes
bis(2-Chloroethoxy)methane	2.0	ug/l	1	-	UJ	Yes
bis(2-Chloroethyl)ether	2.0	ug/l	1	-	UJ	Yes
bis(2-Chloroisopropyl)ether	2.0	ug/l	1	-	UJ	Yes

4-Chlorophenyl phenyl ether	2.0	ug/l	1	-	UJ	Yes
2,4-Dinitrotoluene	1.0	ug/l	1	-	UJ	Yes
2,6-Dinitrotoluene	1.0	ug/l	1	-	UJ	Yes
3,3'-Dichlorobenzidine	2.0	ug/l	1	-	UJ	Yes
Dibenzo(a,h)anthracene	1.0	ug/l	1	-	UJ	Yes
Dibenzofuran	5.1	ug/l	1	-	UJ	Yes
Di-n-butyl phthalate	2.0	ug/l	1	-	UJ	Yes
Di-n-octyl phthalate	2.0	ug/l	1	-	UJ	Yes
Diethyl phthalate	2.0	ug/l	1	-	UJ	Yes
Dimethyl phthalate	2.0	ug/l	1	-	UJ	Yes
bis(2-Ethylhexyl)phthalate	2.0	ug/l	1	-	UJ	Yes
Fluoranthene	1.0	ug/l	1	-	UJ	Yes
Fluorene	1.0	ug/l	1	-	UJ	Yes
Hexachlorobenzene	1.0	ug/l	1	-	UJ	Yes
Hexachlorobutadiene	1.0	ug/l	1	-	UJ	Yes
Hexachlorocyclopentadiene	10	ug/l	1	-	UJ	Yes
Hexachloroethane	2.0	ug/l	1	-	UJ	Yes
Indeno(1,2,3-cd)pyrene	1.0	ug/l	1	-	UJ	Yes
Isophorone	2.0	ug/l	1	-	UJ	Yes
1-Methylnaphthalene	1.0	ug/l	1	-	UJ	Yes
2-Methylnaphthalene	1.0	ug/l	1	-	UJ	Yes
2-Nitroaniline	5.1	ug/l	1	-	UJ	Yes
3-Nitroaniline	5.1	ug/l	1	-	UJ	Yes
4-Nitroaniline	5.1	ug/l	1	-	UJ	Yes
Nitrobenzene	2.0	ug/l	1	-	UJ	Yes
N-Nitroso-di-n-propylamine	2.0	ug/l	1	-	UJ	Yes
Nitrosodiphenylamine	5.1	ug/l	1	-	UJ	Yes
Phenanthrene	1.0	ug/l	1	-	UJ	Yes
Pyrene	1.0	ug/l	1	-	UJ	Yes
1,2,4,5-Tetrachlorobenzene	2.0	ug/l	1	-	UJ	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	0.051	ug/l	1	-	UJ	Yes
Benzo(a)pyrene	0.051	ug/l	1	-	UJ	Yes
Benzo(b)fluoranthene	0.10	ug/l	1	-	UJ	Yes
Benzo(k)fluoranthene	0.10	ug/l	1	-	UJ	Yes
Chrysene	0.10	ug/l	1	-	UJ	Yes
Dibenzo(a,h)anthracene	0.10	ug/l	1	-	UJ	Yes
Indeno(1,2,3-cd)pyrene	0.10	ug/l	1	-	UJ	Yes
Naphthalene	0.10	ug/l	1	-	UJ	Yes
1,4-Dioxane	0.572	ug/l	1	-	J	Yes

Sample ID: JC34496-12MS
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable ✓
2-Chlorophenol	72.5	ug/l	1	-	J	Yes
4-Chloro-3-methyl phenol	97.1	ug/l	1	-	J	Yes
2,4-Dichlorophenol	85.0	ug/l	1	-	J	Yes
2,4-Dimethylphenol	102	ug/l	1	-	J	Yes
2,4-Dinitrophenol	176	ug/l	1	-	J	Yes
4,6-Dinitro-o-cresol	92.9	ug/l	1	-	J	Yes
2-Methylphenol	79.6	ug/l	1	-	J	Yes
3&4-Methylphenol	76.7	ug/l	1	-	J	Yes
2-Nitrophenol	86.2	ug/l	1	-	J	Yes
4-Nitrophenol	66.7	ug/l	1	-	J	Yes
Pentachlorophenol	61.6	ug/l	1	-	J	Yes
Phenol	44.2	ug/l	1	-	J	Yes
2,3,4,6-Tetrachlorophenol	77.4	ug/l	1	-	J	Yes
2,4,5-Trichlorophenol	87.6	ug/l	1	-	J	Yes
2,4,6-Trichlorophenol	90.5	ug/l	1	-	J	Yes
Acenaphthene	87.8	ug/l	1	-	J	Yes
Acenaphthylene	85.5	ug/l	1	-	J	Yes
Acetophenone	92.9	ug/l	1	-	J	Yes
Anthracene	88.9	ug/l	1	-	J	Yes
Atrazine	99.1	ug/l	1	-	J	Yes
Benzaldehyde	75.2	ug/l	1	-	J	Yes
Benzo(a)anthracene	86.7	ug/l	1	-	J	Yes
Benzo(a)pyrene	82.4	ug/l	1	-	J	Yes
Benzo(b)fluoranthene	82.8	ug/l	1	-	J	Yes
Benzo(g,h,i)perylene	79.8	ug/l	1	-	J	Yes
Benzo(k)fluoranthene	88.4	ug/l	1	-	J	Yes
4-Bromophenyl phenyl ether	88.6	ug/l	1	-	J	Yes
Butyl benzyl phthalate	79.6	ug/l	1	-	J	Yes
1,1'-Biphenyl	87.0	ug/l	1	-	J	Yes
2-Chloronaphthalene	82.6	ug/l	1	-	J	Yes
4-Chloroaniline	57.0	ug/l	1	-	J	Yes
Carbazole	87.8	ug/l	1	-	J	Yes
Caprolactam	21.2	ug/l	1	-	J	Yes
Chrysene	84.7	ug/l	1	-	J	Yes
bis(2-Chloroethoxy)methane	87.5	ug/l	1	-	J	Yes

bis(2-Chloroethyl)ether	87.2	ug/l	1	-	J	Yes
bis(2-Chloroisopropyl)ether	72.8	ug/l	1	-	J	Yes
4-Chlorophenyl phenyl ether	89.9	ug/l	1	-	J	Yes
2,4-Dinitrotoluene	102	ug/l	1	-	J	Yes
2,6-Dinitrotoluene	96.2	ug/l	1	-	J	Yes
3,3'-Dichlorobenzidine	137	ug/l	1	-	J	Yes
Dibenzo(a,h)anthracene	83.0	ug/l	1	-	J	Yes
Dibenzofuran	89.8	ug/l	1	-	J	Yes
Di-n-butyl phthalate	88.3	ug/l	1	-	J	Yes
Di-n-octyl phthalate	80.3	ug/l	1	-	J	Yes
Diethyl phthalate	89.3	ug/l	1	-	J	Yes
Dimethyl phthalate	90.3	ug/l	1	-	J	Yes
bis(2-Ethylhexyl)phthalate	80.2	ug/l	1	-	J	Yes
Fluoranthene	91.6	ug/l	1	-	J	Yes
Fluorene	88.3	ug/l	1	-	J	Yes
Hexachlorobenzene	89.2	ug/l	1	-	J	Yes
Hexachlorobutadiene	71.7	ug/l	1	-	J	Yes
Hexachlorocyclopentadiene	115	ug/l	1	-	J	Yes
Hexachloroethane	64.6	ug/l	1	-	J	Yes
Indeno(1,2,3-cd)pyrene	82.8	ug/l	1	-	J	Yes
Isophorone	96.1	ug/l	1	-	J	Yes
1-Methylnaphthalene	82.8	ug/l	1	-	J	Yes
2-Methylnaphthalene	84.1	ug/l	1	-	J	Yes
2-Nitroaniline	103	ug/l	1	-	J	Yes
3-Nitroaniline	65.7	ug/l	1	-	J	Yes
4-Nitroaniline	86.2	ug/l	1	-	J	Yes
Nitrobenzene	94.9	ug/l	1	-	J	Yes
N-Nitroso-di-n-propylamine	92.0	ug/l	1	-	J	Yes
Nitrosodiphenylamine	85.6	ug/l	1	-	J	Yes
Phenanthrene	91.5	ug/l	1	-	J	Yes
Pyrene	90.2	ug/l	1	-	J	Yes
1,2,4,5-Tetrachlorobenzene	89.2	ug/l	1	-	J	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	1.72	ug/l	1	-	J	Yes
Benzo(a)pyrene	1.47	ug/l	1	-	J	Yes
Benzo(b)fluoranthene	1.56	ug/l	1	-	J	Yes
Benzo(k)fluoranthene	1.55	ug/l	1	-	J	Yes
Chrysene	1.58	ug/l	1	-	J	Yes
Dibenzo(a,h)anthracene	1.29	ug/l	1	-	J	Yes
Indeno(1,2,3-cd)pyrene	1.32	ug/l	1	-	J	Yes
Naphthalene	1.69	ug/l	1	-	J	Yes
1,4-Dioxane	1.51	ug/l	1	-	J	Yes

Sample ID: JC34496-12MSD
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable ✓
2-Chlorophenol	68.7	ug/l	1	-	J	Yes
4-Chloro-3-methyl phenol	93.3	ug/l	1	-	J	Yes
2,4-Dichlorophenol	80.4	ug/l	1	-	J	Yes
2,4-Dimethylphenol	95.7	ug/l	1	-	J	Yes
2,4-Dinitrophenol	180	ug/l	1	-	J	Yes
4,6-Dinitro-o-cresol	94.2	ug/l	1	-	J	Yes
2-Methylphenol	77.8	ug/l	1	-	J	Yes
3&4-Methylphenol	74.8	ug/l	1	-	J	Yes
2-Nitrophenol	83.4	ug/l	1	-	J	Yes
4-Nitrophenol	70.1	ug/l	1	-	J	Yes
Pentachlorophenol	64.6	ug/l	1	-	J	Yes
Phenol	45.8	ug/l	1	-	J	Yes
2,3,4,6-Tetrachlorophenol	79.5	ug/l	1	-	J	Yes
2,4,5-Trichlorophenol	85.1	ug/l	1	-	J	Yes
2,4,6-Trichlorophenol	88.9	ug/l	1	-	J	Yes
Acenaphthene	84.9	ug/l	1	-	J	Yes
Acenaphthylene	81.7	ug/l	1	-	J	Yes
Acetophenone	88.8	ug/l	1	-	J	Yes
Anthracene	86.0	ug/l	1	-	J	Yes
Atrazine	99.4	ug/l	1	-	J	Yes
Benzaldehyde	71.8	ug/l	1	-	J	Yes
Benzo(a)anthracene	85.7	ug/l	1	-	J	Yes
Benzo(a)pyrene	82.6	ug/l	1	-	J	Yes
Benzo(b)fluoranthene	82.5	ug/l	1	-	J	Yes
Benzo(g,h,i)perylene	79.0	ug/l	1	-	J	Yes
Benzo(k)fluoranthene	87.5	ug/l	1	-	J	Yes
4-Bromophenyl phenyl ether	84.9	ug/l	1	-	J	Yes
Butyl benzyl phthalate	78.4	ug/l	1	-	J	Yes
1,1'-Biphenyl	83.5	ug/l	1	-	J	Yes
2-Chloronaphthalene	76.4	ug/l	1	-	J	Yes
4-Chloroaniline	60.8	ug/l	1	-	J	Yes
Carbazole	90.0	ug/l	1	-	J	Yes
Caprolactam	23.8	ug/l	1	-	J	Yes
Chrysene	83.6	ug/l	1	-	J	Yes
bis(2-Chloroethoxy)methane	80.5	ug/l	1	-	J	Yes
bis(2-Chloroethyl)ether	83.0	ug/l	1	-	J	Yes

bis(2-Chloroisopropyl)ether	66.4	ug/l	1	-	J	Yes
4-Chlorophenyl phenyl ether	88.6	ug/l	1	-	J	Yes
2,4-Dinitrotoluene	100	ug/l	1	-	J	Yes
2,6-Dinitrotoluene	96.0	ug/l	1	-	J	Yes
3,3'-Dichlorobenzidine	143	ug/l	1	-	J	Yes
Dibenzo(a,h)anthracene	81.7	ug/l	1	-	J	Yes
Dibenzofuran	88.5	ug/l	1	-	J	Yes
Di-n-butyl phthalate	88.6	ug/l	1	-	J	Yes
Di-n-octyl phthalate	80.0	ug/l	1	-	J	Yes
Diethyl phthalate	89.2	ug/l	1	-	J	Yes
Dimethyl phthalate	89.1	ug/l	1	-	J	Yes
bis(2-Ethylhexyl)phthalate	81.5	ug/l	1	-	J	Yes
Fluoranthene	90.5	ug/l	1	-	J	Yes
Fluorene	87.3	ug/l	1	-	J	Yes
Hexachlorobenzene	86.7	ug/l	1	-	J	Yes
Hexachlorobutadiene	66.1	ug/l	1	-	J	Yes
Hexachlorocyclopentadiene	107	ug/l	1	-	J	Yes
Hexachloroethane	61.9	ug/l	1	-	J	Yes
Indeno(1,2,3-cd)pyrene	81.7	ug/l	1	-	J	Yes
Isophorone	88.4	ug/l	1	-	J	Yes
1-Methylnaphthalene	78.9	ug/l	1	-	J	Yes
2-Methylnaphthalene	79.9	ug/l	1	-	J	Yes
2-Nitroaniline	102	ug/l	1	-	J	Yes
3-Nitroaniline	72.5	ug/l	1	-	J	Yes
4-Nitroaniline	87.0	ug/l	1	-	J	Yes
Nitrobenzene	88.8	ug/l	1	-	J	Yes
N-Nitroso-di-n-propylamine	84.5	ug/l	1	-	J	Yes
Nitrosodiphenylamine	83.2	ug/l	1	-	J	Yes
Phenanthrene	87.7	ug/l	1	-	J	Yes
Pyrene	88.8	ug/l	1	-	J	Yes
1,2,4,5-Tetrachlorobenzene	84.6	ug/l	1	-	J	Yes

METHOD: 8270D (SIM)

Benzo(a)anthracene	1.66	ug/l	1	-	J	Yes
Benzo(a)pyrene	1.37	ug/l	1	-	J	Yes
Benzo(b)fluoranthene	1.47	ug/l	1	-	J	Yes
Benzo(k)fluoranthene	1.42	ug/l	1	-	J	Yes
Chrysene	1.52	ug/l	1	-	J	Yes
Dibenzo(a,h)anthracene	1.17	ug/l	1	-	J	Yes
Indeno(1,2,3-cd)pyrene	1.18	ug/l	1	-	J	Yes
Naphthalene	1.50	ug/l	1	-	J	Yes
1,4-Dioxane	1.56	ug/l	1	-	J	Yes

DATA REVIEW WORKSHEETS

Project Number: JC34496
 Date: December 22-23, 2016
 Shipping Date: December 27, 2016
 EPA Region: 2

REVIEW OF SEMIVOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: EPA Hazardous Waste Support Section, SOP HW-35A, July 2015 –Revision 0. *Semivolatile Data Validation*. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for SVOCs included:

Lab. Project/SDG No.: JC34496 Sample matrix: Groundwater
 No. of Samples: 10 SIM/10 SCAN
 Trip blank No.: -
 Field blank No.: JC34496-2; JC34496-9
 Equipment blank No.: JC34496-7
 Field duplicate No.:

<input checked="" type="checkbox"/> Data Completeness	<input checked="" type="checkbox"/> Laboratory Control Spikes
<input checked="" type="checkbox"/> Holding Times	<input checked="" type="checkbox"/> Field Duplicates
<input checked="" type="checkbox"/> GC/MS Tuning	<input checked="" type="checkbox"/> Calibrations
<input checked="" type="checkbox"/> Internal Standard Performance	<input checked="" type="checkbox"/> Compound Identifications
<input checked="" type="checkbox"/> Blanks	<input checked="" type="checkbox"/> Compound Quantitation
<input checked="" type="checkbox"/> Surrogate Recoveries	<input checked="" type="checkbox"/> Quantitation Limits
<input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate	

Overall Comments: SVOCs TCL special list analyzed by method SW846-8270D; Selected PAHs and 1,4-Dioxane analyzed by method SW846-8270D (SIM)
4TH Q 2016 Groundwater Sampling-Onsite Wells

Definition of Qualifiers:

J- Estimated results
 U- Compound not detected
 R- Rejected data
 UJ- Estimated nondetect

Reviewer: Rafael Difant
 Date: February 2, 2017

DATA COMPLETENESS

DATE RECEIVED

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED/ANALYZED	pH	ACTION
JC34496-12	12/23/16	01/03/17	-	Results qualified as estimated J or UJ in samples JC34496-12; JC34496-12MS; JC34496-12MSD
All samples extracted and analyzed within method recommended holding time except for the cases described in this document. Sample preservation appropriate.				

Cooler temperature (Criteria: 4 ± 2 °C): 5.5°C

Actions

Results will be qualified based on the criteria of the following Table:

Table 1. Holding Time Actions for Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (for extraction) ≤ 40 days (for analysis)	Use professional judgment	
	No	> 7 days (for extraction) > 40 days (for analysis)	J	Use professional judgment
	Yes	≤ 7 days (for extraction) ≤ 40 days (for analysis)	No qualification	
	Yes	> 7 days (for extraction) > 40 days (for analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R
Non-Aqueous	No	≤ 14 days (for extraction) ≤ 40 days (for analysis)	Use professional judgment	
	No	> 14 days (for extraction) > 40 days (for analysis)	J	Use professional judgment
	Yes	≤ 14 days (for extraction) ≤ 40 days (for analysis)	No qualification	
	Yes	> 14 days (for extraction) > 40 days (for analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met see below

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

 X The DFTPP performance results were reviewed and found to be within the specified criteria.

 X DFTPP tuning was performed for every 12 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

Notes: These requirements do not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique.

All mass spectrometer conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortion are unacceptable

Notes: No data should be qualified based of DFTPP failure.

The requirement to analyze the instrument performance check solution is optional when analysis of PAHs/pentachlorophenol is to be performed by the SIM technique.

List the samples affected:

Actions:

1. If sample are analyzed without a preceding valid instrument performance check or are analyzed 12 hours after the Instrument Performance Check, qualify all data in those samples as unusable (R).
2. If ion abundance criteria are not met, use professional judgment to determine to what extent the data may be utilized.
3. State in the Data Review Narrative, decisions to use analytical data associated with DFTPP instrument performance checks not meeting the contract requirements.
4. Use professional judgment to determine if associated data should be qualified based on the spectrum of the mass calibration compounds.

DATA REVIEW WORKSHEETS

All criteria were met ☒ X
 Criteria were not met
 and/or see below _____

INITIAL CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 12/22-23/16 (SCAN) 12/14/16 (SIM)
 Instrument ID numbers: GCMS6P GCMS4M
 Matrix/Level: Aqueous/low Aqueous/low
 Date of initial calibration: 11/16/16; 12/01/16 (SCAN) 12/27-28/16 (SCAN)
 Instrument ID numbers: GCMS2M GCMSZ
 Matrix/Level: Aqueous/low Aqueous/low

DATE	LAB ID#	FILE	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and initial calibration verification meets the method and guidance validation document performance criteria.					

Note: Instruments GCMS2P; GCMS3P; GCMSZ (01/06/17); and GCMS4M (12/30/16) were also employed for running QC samples for this data packages. QC samples not validated.

Actions:

Qualify the initial calibration analytes listed in Table 2 using the following criteria:

Table 3. Initial Calibration Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
Initial Calibration not performed at specified frequency and sequence	Use professional judgment R	Use professional judgment R
Initial Calibration not performed at the specified concentrations	J	UJ
RRF < Minimum RRF in Table 2 for target analyte	Use professional judgment J+ or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	No qualification	No qualification
%RSD > Maximum %RSD in Table 2 for target analyte	J	Use professional judgment
%RSD ≤ Maximum %RSD in Table 2 for target analyte	No qualification	No qualification

DATA REVIEW WORKSHEETS

Initial Calibration

Table 2. RRF, %RSD, and %D Acceptance Criteria in Initial Calibration and CCV for Semivolatil Analysis

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Opening Maximum %D ¹
1,4-Dioxane	0.010	40.0	± 40.0	± 50.0
Benzaldehyde	0.100	40.0	± 40.0	± 50.0
Phenol	0.080	20.0	± 20.0	± 25.0
Bis(2-chloroethyl)ether	0.100	20.0	± 20.0	± 25.0
2-Chlorophenol	0.200	20.0	± 20.0	± 25.0
2-Methylphenol	0.010	20.0	± 20.0	± 25.0
3-Methylphenol	0.010	20.0	± 20.0	± 25.0
2,2'-Oxybis-(1-chloropropane)	0.010	20.0	± 25.0	± 50.0
Acetophenone	0.060	20.0	± 20.0	± 25.0
4-Methylphenol	0.010	20.0	± 20.0	± 25.0
N-Nitroso-di-n-propylamine	0.080	20.0	± 25.0	± 25.0
Hexachloroethane	0.100	20.0	± 20.0	± 25.0
Nitrobenzene	0.090	20.0	± 20.0	± 25.0
Isophorone	0.100	20.0	± 20.0	± 25.0
2-Nitrophenol	0.060	20.0	± 20.0	± 25.0
2,4-Dimethylphenol	0.050	20.0	± 25.0	± 50.0
Bis(2-chloroethoxy)methane	0.080	20.0	± 20.0	± 25.0
2,4-Dichlorophenol	0.060	20.0	± 20.0	± 25.0
Naphthalene	0.200	20.0	± 20.0	± 25.0
4-Chloroaniline	0.010	40.0	± 40.0	± 50.0
Hexachlorobutadiene	0.040	20.0	± 20.0	± 25.0
Caprolactam	0.010	40.0	± 30.0	± 50.0
4-Chloro-3-methylphenol	0.040	20.0	± 20.0	± 25.0
2-Methylnaphthalene	0.100	20.0	± 20.0	± 25.0
Hexachlorocyclopentadiene	0.010	40.0	± 40.0	± 50.0
2,4,6-Trichlorophenol	0.090	20.0	± 20.0	± 25.0
2,4,5-Trichlorophenol	0.100	20.0	± 20.0	± 25.0
1,1'-Biphenyl	0.200	20.0	± 20.0	± 25.0

DATA REVIEW WORKSHEETS

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Opening Maximum %D ¹
2-Chloronaphthalene	0.300	20.0	± 20.0	± 25.0
2-Nitroaniline	0.060	20.0	± 25.0	± 25.0
Dimethylphthalate	0.300	20.0	± 25.0	± 25.0
2,6-Dinitrotoluene	0.080	20.0	± 20.0	± 25.0
Acenaphthylene	0.400	20.0	± 20.0	± 25.0
3-Nitroaniline	0.010	20.0	± 25.0	± 50.0
Acenaphthene	0.200	20.0	± 20.0	± 25.0
2,4-Dinitrophenol	0.010	40.0	± 50.0	± 50.0
4-Nitrophenol	0.010	40.0	± 40.0	± 50.0
Dibenzofuran	0.300	20.0	± 20.0	± 25.0
2,4-Dinitrotoluene	0.070	20.0	± 20.0	± 25.0
Diethylphthalate	0.300	20.0	± 20.0	± 25.0
1,2,4,5-Tetrachlorobenzene	0.100	20.0	± 20.0	± 25.0
4-Chlorophenyl-phenylether	0.100	20.0	± 20.0	± 25.0
Fluorene	0.200	20.0	± 20.0	± 25.0
4-Nitroaniline	0.010	40.0	± 40.0	± 50.0
4,6-Dinitro-2-methylphenol	0.010	40.0	± 30.0	± 50.0
4-Bromophenyl-phenyl ether	0.070	20.0	± 20.0	± 25.0
N-Nitrosodiphenylamine	0.100	20.0	± 20.0	± 25.0
Hexachlorobenzene	0.050	20.0	± 20.0	± 25.0
Atrazine	0.010	40.0	± 25.0	± 50.0
Pentachlorophenol	0.010	40.0	± 40.0	± 50.0
Phenanthrene	0.200	20.0	± 20.0	± 25.0
Anthracene	0.200	20.0	± 20.0	± 25.0
Carbazole	0.050	20.0	± 20.0	± 25.0
Di-n-butylphthalate	0.500	20.0	± 20.0	± 25.0
Fluoranthene	0.100	20.0	± 20.0	± 25.0
Pyrene	0.400	20.0	± 25.0	± 50.0
Butylbenzylphthalate	0.100	20.0	± 25.0	± 50.0

DATA REVIEW WORKSHEETS

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Opening Maximum %D ¹
3,3'-Dichlorobenzidine	0.010	40.0	± 40.0	± 50.0
Benzo(a)anthracene	0.300	20.0	± 20.0	± 25.0
Chrysene	0.200	20.0	± 20.0	± 50.0
Bis(2-ethylhexyl) phthalate	0.200	20.0	± 25.0	± 50.0
Di-n-octylphthalate	0.010	40.0	± 40.0	± 50.0
Benzo(b)fluoranthene	0.010	20.0	± 25.0	± 50.0
Benzo(k)fluoranthene	0.010	20.0	± 25.0	± 50.0
Benzo(a)pyrene	0.010	20.0	± 20.0	± 50.0
Indeno(1,2,3-cd)pyrene	0.010	20.0	± 25.0	± 50.0
Dibenzo(a,h)anthracene	0.010	20.0	± 25.0	± 50.0
Benzo(g,h,i)perylene	0.010	20.0	± 30.0	± 50.0
2,3,4,6-Tetrachlorophenol	0.040	20.0	± 20.0	± 50.0
Naphthalene	0.600	20.0	± 25.0	± 25.0
2-Methylnaphthalene	0.300	20.0	± 20.0	± 25.0
Acenaphthylene	0.900	20.0	± 20.0	± 25.0
Acenaphthene	0.500	20.0	± 20.0	± 25.0
Fluorene	0.700	20.0	± 25.0	± 50.0
Phenanthrene	0.300	20.0	± 25.0	± 50.0
Anthracene	0.400	20.0	± 25.0	± 50.0
Fluoranthene	0.400	20.0	± 25.0	± 50.0
Pyrene	0.500	20.0	± 30.0	± 50.0
Benzo(a)anthracene	0.400	20.0	± 25.0	± 50.0
Chrysene	0.400	20.0	± 25.0	± 50.0
Benzo(b)fluoranthene	0.100	20.0	± 30.0	± 50.0
Benzo(k)fluoranthene	0.100	20.0	± 30.0	± 50.0
Benzo(a)pyrene	0.100	20.0	± 25.0	± 50.0
Indeno(1,2,3-cd)pyrene	0.100	20.0	± 40.0	± 50.0
Dibenzo(a,h)anthracene	0.010	25.0	± 40.0	± 50.0
Benzo(g,h,i)perylene	0.020	25.0	± 40.0	± 50.0

DATA REVIEW WORKSHEETS

Pentachlorophenol	0.010	40.0	± 50.0	± 50.0
Deuterated Monitoring Compounds				
Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D ¹	Closing Maximum %D
1,4-Dioxane-d ₈	0.010	20.0	± 25.0	± 50.0
Phenol-d ₅	0.010	20.0	± 25.0	± 25.0
Bis-(2-chloroethyl)ether-d ₈	0.100	20.0	± 20.0	± 25.0
2-Chlorophenol-d ₄	0.200	20.0	± 20.0	± 25.0
4-Methylphenol-d ₈	0.010	20.0	± 20.0	± 25.0
4-Chloroaniline-d ₄	0.010	40.0	± 40.0	± 50.0
Nitrobenzene-d ₅	0.050	20.0	± 20.0	± 25.0
2-Nitrophenol-d ₄	0.050	20.0	± 20.0	± 25.0
2,4-Dichlorophenol-d ₃	0.060	20.0	± 20.0	± 25.0
Dimethylphthalate-d ₆	0.300	20.0	± 20.0	± 25.0
Acenaphthylene-d ₈	0.400	20.0	± 20.0	± 25.0
4-Nitrophenol-d ₄	0.010	40.0	± 40.0	± 50.0
Fluorene-d ₁₀	0.100	20.0	± 20.0	± 25.0
4,6-Dinitro-2-methylphenol-d ₂	0.010	40.0	± 30.0	± 50.0
Anthracene-d ₁₀	0.300	20.0	± 20.0	± 25.0
Pyrene-d ₁₀	0.300	20.0	± 25.0	± 50.0
Benzo(a)pyrene-d ₁₂	0.010	20.0	± 20.0	± 50.0
Fluoranthene-d ₁₀ (SIM)	0.400	20.0	± 25.0	± 50.0
2-Methylnaphthalene-d ₁₀ (SIM)	0.300	20.0	± 20.0	± 25.0

¹ If a closing CCV is acting as an opening CCV, all target analytes must meet the requirements for an opening CCV.

Note: If analysis by SIM technique is requested for PAH/pentachlorophenols, calibration standards analyzed at 0.10, 0.20, 0.40, 0.80, and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four point initial calibration at 0.20, 0.40, 0.80, and 1.0 ng/uL.

DATA REVIEW WORKSHEETS

All criteria were met _____
 Criteria were not met _____
 and/or see below X

CONTINUING CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:	<u>11/16/16; 12/01/16 (SCAN)</u>	<u>12/14/16 (SIM)</u>
Date of initial calibration verification (ICV):	<u>11/16-17/16; 12/01/16</u>	<u>12/14/16; 12/19/16</u>
Date of continuing calibration verification (CCV):	<u>01/05/17</u>	<u>12/30-31/16; 01/05/17</u>
Date of closing CCV:	<u>-</u>	<u>-</u>
Instrument ID numbers:	<u>GCMS2M</u>	<u>GCMS4M</u>
Matrix/Level:	<u>Aqueous/low</u>	<u>Aqueous/low</u>

Date of initial calibration:	<u>12/22-23/16 (SCAN)</u>	<u>12/27-28/16 (Scan)</u>
Date of initial calibration verification (ICV):	<u>12/22-23/16</u>	<u>12/28/16</u>
Date of continuing calibration verification (CCV):	<u>01/04/17; 01/06/17</u>	<u>01/03/17; 01/06/17</u>
Date of closing CCV:	<u>-</u>	<u>-</u>
Instrument ID numbers:	<u>GCMS6P</u>	<u>GCMSZ</u>
Matrix/Level:	<u>Aqueous/low</u>	<u>Aqueous/low</u>

DATE	LAB ID#	FILE	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
GCMS2M					
01/05/17	cc3953-25		25.5	1,4-dioxane*	JC34496-7; -9; -10
			33.0	Hexachlorocyclopentadiene*	
			-25.9	di-n-octylphthalate*	
			-35.8	Indeno(1,2,3-cd)pyrene*	
GCMS6P					
01/04/17	cc1534-25		23.8	Hexachlorocyclopentadiene*	JC34496-12
01/06/17	cc1534-50		-29.2	2-nitroaniline	JC34496-4
			-30.7	4-nitrophenol	
01/06/17	cc1535-50		24.0	Benzaldehyde*	
GCMSZ					
01/03/17	cc5841-25		-23.8	Caprolactam*	JC34496-1; -2; -3; -4
			-25.7	2-nitroaniline	
			-25.6	3,3'-dichlorobenzidine*	
			-21.4	Indeno(1,2,3-cd)pyrene*	

Note: Initial and continuing calibration verifications meet the method and guidance document required performance criteria except for the cases described in this document. Results qualified as estimated (J or UJ) in affected samples.

* % difference outside was method performance criteria but within the guidance document performance criteria. No action taken.

No action taken for QC samples.

DATA REVIEW WORKSHEETS

No closing calibration verification included in data package. No action taken, professional judgment.

Actions:

Notes: Verify that the CCV is run at the required frequency (an opening and closing CCV must be run within 12-hour period).

All DMCs must meet the RRF values given in Table 2. No qualification of the data is necessary on DMCs RRF and %RSD/%D alone. Use professional judgment to evaluate DMCs and %RSD/%D data in conjunction with DMCs recoveries to determine the need for qualification of the data.

Qualify the initial calibration analytes listed in Table 2 using the following criteria in the CCVs:

Table 4. CCV Actions for Semivolatile Analysis

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detect	Non-detect
CCV not performed at required frequency and sequence	CCV not performed at required frequency	Use professional judgment R	Use professional judgment R
CCV not performed at specified concentration	CCV not performed at specified concentration	Use professional judgment	Use professional judgment
RRF < Minimum RRF in Table 2 for target analyte	RRF < Minimum RRF in Table 2 for target analyte	Use professional judgment J or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	RRF ≥ Minimum RRF in Table 2 for target analyte	No qualification	No qualification
%D outside the Opening Maximum %D limits in Table 2 for target analyte	%D outside the Closing Maximum %D limits in Table 2 for target analyte	J	UJ
%D within the inclusive Opening Maximum %D limits in Table 2 for target analyte	%D within the inclusive Closing Maximum %D limits in Table 2 for target analyte	No qualification	No qualification

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Notes: The concentration of non-target compounds in all blanks must be less than or equal to 10 ug/L.

The concentration of target compounds in all blanks must be less than its CRQL listed in the method.

Samples taken from a drinking water tap do not have an associated field blank.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analytes detected in method blanks				

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No target analytes detected in the field/equipment blanks analyzed with this data package.				

Note:

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Qualify samples based on the criteria summarized in Table 5:

Table 5. Blank and TCLP/SPLP LEB Actions for Semivolatile Analysis

Blank Type	Blank Result	Sample Result	Action
Method, TCLP/SPLP LEB, Field	Detect	Non-detect	No qualification
	< CRQL	< CRQL	Report at CRQL and qualify as non-detect (U)
		≥ CRQL	Use professional judgment
	≥ CRQL	< CRQL	Report at CRQL and qualify as non-detect (U)
		≥ CRQL but < Blank Result	Report at sample results and qualify as non-detect (U) or as unusable (R)
		≥ CRQL and ≥ Blank Result	Use professional judgment
	Grossly high	Detect	Report at sample results and qualify as unusable (R)
	TIC > 5.0 ug/L (water) or 0.0050 mg/L (TCLP leachate) or TIC > 170 ug/Kg (soil)	Detect	Use professional judgment

List samples qualified

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

SURROGATE SPIKE RECOVERIES – DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries – deuterated monitoring compounds. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

Notes: Recoveries for DMCs in samples and blanks must be within the limits specified in Table 6.

The recovery limits for any of the compounds listed in Table 6 may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

If a DMC is not added in the samples and blanks or the concentrations of DMCs in the samples and blank not the specified, use professional judgment in qualifying the data.

Table 7. DMC Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
%R < 10% (excluding DMCs with 10% as a lower acceptance limit)	J-	R
10% ≤ %R (excluding DMCs with 10% as a lower acceptance limit) < Lower Acceptance Limit	J-	UJ
Lower Acceptance limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

List the percent recoveries (%Rs) which do not meet the criteria for DMCs (surrogate) recovery.

Matrix: Groundwater

SAMPLE ID

SURROGATE COMPOUND

ACTION

DMCs meet the required criteria in all samples analyzed. Non-deuterated surrogates added to the samples and were within laboratory recovery limits.

Note:

DATA REVIEW WORKSHEETS

Table 8. Semivolatile DMCs and the Associated Target Analytes

1,4-Dioxane-d₈ (DMC-1)	Phenol-d₅ (DMC-2)	Bis(2-Chloroethyl) ether-d₈ (DMC-3)
1,4-Dioxane	Benzaldehyde Phenol	Bis(2-chloroethyl)ether 2,2'-Oxybis(1-chloropropane) Bis(2-chloroethoxy)methane
2-Chlorophenol-d₄ (DMC-4)	4-Methylphenol-d₈ (DMC-5)	4-Chloroaniline-d₄ (DMC-6)
2-Chlorophenol	2-Methylphenol 3-Methylphenol 4-Methylphenol 2,4-Dimethylphenol	4-Chloroaniline Hexachlorocyclopentadiene Dichlorobenzidine
Nitrobenzene-d₅ (DMC-7)	2-Nitrophenol-d₄ (DMC-8)	2,4-Dichlorophenol-d₃ (DMC-9)
Acetophenone N-Nitroso-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrosodiphenylamine	Isophorone 2-Nitrophenol	2,4-Dichlorophenol Hexachlorobutadiene Hexachlorocyclopentadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachlorobenzene *Pentachlorophenol 2,3,4,6-Tetrachlorophenol
Dimethylphthalate-d₆ (DMC-10)	Acenaphthylene-d₈ (DMC-11)	4-Nitrophenol-d₄ (DMC-12)
Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate Bis(2-ethylhexyl) phthalate Di-n-octylphthalate	*Naphthalene *2-Methylnaphthalene 2-Chloronaphthalene *Acenaphthylene *Acenaphthene	2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline

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Fluorene-d₁₀ (DMC-13)	4,6-Dinitro-2-methylphenol-d₂ (DMC-14)	Anthracene-d₁₀ (DMC-15)
Dibenzofuran *Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	4,6-Dinitro-2-methylphenol	Hexachlorobenzene Atrazine *Phenanthrene *Anthracene
Pyrene-d₁₀ (DMC-16)	Benzo(a)pyrene-d₁₂ (DMC-17)	
*Fluoranthene *Pyrene *Benzo(a)anthracene *Chrysene	3,3'-Dichlorobenzidine *Benzo(b)fluoranthene *Benzo(k)fluoranthene *Benzo(a)pyrene *Indeno(1,2,3-cd)pyrene *Dibenzo(a,h)anthracene *Benzo(g,h,i)perylene	

*Included in optional Target Analyte List (TAL) of PAHs and PCP only.

Table 9. Semivolatile SIM DMCs and the Associated Target Analytes

Fluoranthene-d₁₀ (DMC-1)	2-Methylnaphthalene-d₁₀ (DMC-2)
Fluoranthene	Naphthalene
Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Dibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

DATA REVIEW WORKSHEETS

All criteria were met _____
 Criteria were not met _____
 and/or see below _____X_____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

NOTES: Data for MS and MSDs will not be present unless requested by the Region.
 Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: _____JC34355-1_____	Matrix/Level: _____Groundwater_____
Sample ID: _____JC34355-1_(SIM)_____	Matrix/Level: _____Groundwater_____
Sample ID: _____JC34266-20_____	Matrix/Level: _____Groundwater_____
Sample ID: _____JC34421-1_(SIM)_____	Matrix/Level: _____Groundwater_____
Sample ID: _____JC34496-12_____	Matrix/Level: _____Groundwater_____
Sample ID: _____JC34496-12_(SIM)_____	Matrix/Level: _____Groundwater_____

Note: MS/MSD % recovery and RPD within laboratory control limits.

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

DATA REVIEW WORKSHEETS

If 25 % or more of all MS/MSD %R were $< LL$ (or 70 %) or if two or more MS/MSD %Rs were $< 10\%$, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met X
Criteria were not met
and/or see below _____

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION
------	-----------	--------	---------	------------------	--------

1. If an internal standard area count for a sample or blank is greater than 213.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table 10 below):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
 - b. Do not qualify non-detected associated compounds.
2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).
 - b. Qualify non-detected associated compounds as unusable (R).
3. If an internal standard area count for a sample or blank is greater than or equal to 50.0%, and less than or equal to 213% of the area for the associated standard opening CCV or mid-point standard from initial calibration, no qualification of the data is necessary.
4. If an internal standard RT varies by more than 10.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.
5. If an internal standard RT varies by less than or equal to 10.0 seconds, no qualification of the data is necessary.

DATA REVIEW WORKSHEETS

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

State in the Data Review Narrative if the required internal standard compounds are not added to a sample or blank or if the required internal standard compound is not analyzed at the specified concentration.

Actions:

Table 10. Internal Standard Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
Area response < 20% of the opening CCV or mid-point standard CS3 from ICAL	J+	R
20% ≤ Area response < 50% of the opening CCV or mid-point standard CS3 from ICAL	J+	UJ
50% ≤ Area response ≤ 200% of the opening CCV or mid-point standard CS3 from ICAL	No qualification	No qualification
Area response > 200% of the opening CCV or mid-point standard CS3 from ICAL	J-	No qualification
RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL > 10.0 seconds	R	R
RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL < 10.0 seconds	No qualification	No qualification

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below _____

TARGET COMPOUND IDENTIFICATION

Criteria:

Is the Relative Retention Times (RRTs) of reported compounds within ± 0.06 RRT units of the standard RRT [opening Continuing Calibration Verification (CCV) or mid-point standard from the initial calibration].
Yes? or No?

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
=====	=====	=====
_____	_____	_____
_____	_____	_____
_____	_____	_____

Mass spectra of the sample compound and a current laboratory-generated standard [i.e., the mass spectrum from the associated calibration standard (opening CCV or mid-point standard from initial calibration)] must match according to the following criteria:

- All ions present in the standard mass spectrum at a relative intensity greater than 10% must be present in the sample spectrum.
- The relative intensities of these ions must agree within $\pm 20\%$ between the standard and sample spectra (e.g., for an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30-70%).
- Ions present at greater than 10% in the sample mass spectrum, but not present in the standard spectrum, must be evaluated by a reviewer experienced in mass spectral interpretation.

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
=====	=====	=====
_____	_____	_____
Identified compounds meet the required criteria	_____	_____
_____	_____	_____

DATA REVIEW WORKSHEETS

Action:

1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).
2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.
3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

List TICs

Sample ID	Compound	Sample ID	Compound
=====			
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Action:

1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
2. General actions related to the review of TIC results are as follows:
 - a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
 - b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
3. In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).
4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).

DATA REVIEW WORKSHEETS

5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

DATA REVIEW WORKSHEETS

All criteria were met ☒ X
 Criteria were not met
 and/or see below _____

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

1. When a sample is analyzed at more than one dilution, the lower CRQL are used unless a QC exceedance dictates the use of higher CRQLs from the diluted sample. Samples reported with an "E" qualifier should be reported from the diluted sample.
2. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
3. For non-aqueous samples, if the solids is less than 10.0%, use professional judgment for both detects and non-detects. If the percent solid for a soil sample is greater than or equal to 10.0% and less than 30.0%, use professional judgment to qualify detects and non-detects. If the percent solid for a soil sample is greater than or equal to 30.0%, detects and non-detects should not be qualified (see Table 11).
4. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
5. Results between MDL and CRQL should be qualified as estimated "J".
6. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves should not be reported.

Table 11. Percent Solids Actions for Semivolatile Analysis for Non-Aqueous Samples

Criteria	Action	
	Detects	Non-detects
%Solids < 10.0%	Use professional judgment	Use professional judgment
10.0% ≤ %Solids ≤ 30.0%	Use professional judgment	Use professional judgment
%Solids > 30.0%	No qualification	No qualification

SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

Sample ID: JC34496-12_MS Analyte: 2,4-dimethylphenol RF: 0.361

$$\begin{aligned}
 [] &= (39629)(40)/(527349)(0.361) \\
 &= 8.32 \text{ ppm} \quad \text{Ok}
 \end{aligned}$$

DATA REVIEW WORKSHEETS

QUANTITATION LIMITS

A. Dilution performed

[illegible]

DATA REVIEW WORKSHEETS

All criteria were met __N/A__
 Criteria were not met
 and/or see below _____

FIELD DUPLICATE PRECISION

Sample IDs: _____ - _____

Matrix: _____ - _____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: if large RPD (> 50 %) is observed, confirm identification of the samples and note differences. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL ug/L	SAMPLE CONC. (ug/l)	DUPLICATE CONC. (ug/l)	RPD	ACTION
No field/laboratory duplicate analyzed as part of this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required guidance document criteria < 50 % for detected target analytes above 5 SQL except for the cases described in this document.					

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

OTHER ISSUES

A. System Performance

List samples qualified based on the degradation of system performance during sample analysis:

Sample ID	Comments	Actions
=====	=====	=====
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Action:

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Inform the Contract Laboratory Program COR any action as a result of degradation of system performance which significantly affected the data.

B. Overall Assessment of Data

List samples qualified based on other issues:

Sample ID	Comments	Actions
=====	=====	=====
_No other issues that required the need to qualify the data. Results are valid and can be used for decision purposes. Other discrepancies are shown below._____		
_____	_____	_____
_____	_____	_____

Note: The acid surrogate standard not added to the LCS analyzed on 12/28/16. The affected samples either was not re-extracted because no sample was left or extracted outside the method recommended holding time. No action taken, professional judgment.

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of

DATA REVIEW WORKSHEETS

the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

3. Sometimes, due to dilutions, re-analysis or SIM/Scan runs are being performed, there will be multiple results for a single analyte from a single sample. The following criteria and professional judgment are used to determine which result should be reported:
 - The analysis with the lower CRQL
 - The analysis with the better QC results
 - The analysis with the higher results

EXECUTIVE NARRATIVE

SDG No: **JC34496** Laboratory: **Accutest, New Jersey**
Analysis: **SW846-8015C** Number of Samples: **10**
Location: **BMSMC, Building 5 Area**
4th Q 2016 Groundwater Sampling-Onsite Wells
Humacao, PR

SUMMARY: Ten (10) samples were analyzed for the low molecular weight alcohols (LMWAs) list following method SW846-8015C. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update III, December 1996)," specifically for Methods 8000/8015C are utilized. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: **None**
Major: **None**
Minor: **None**

Critical findings: **None**
Major findings: **None**
Minor findings: **None**

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888



Signature:

Date: February 3, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC34496-1

Sample location: BMSMC Building 5 Area

Sampling date: 12/22/2016

Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-2

Sample location: BMSMC Building 5 Area

Sampling date: 11/22/2016

Matrix: AQ - Field Blank water

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-3

Sample location: BMSMC Building 5 Area

Sampling date: 12/22/2016

Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-4
Sample location: BMSMC Building 5 Area
Sampling date: 12/22/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-7
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: AQ - Equipment Blank

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-9
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: AQ - Field Blank Water

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes



Sample ID: JC34496-10
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-12
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	100	ug/l	1.0	-	U	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC34496-12MS
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	5030	ug/l	1.0	-	-	Yes
Isobutyl Alcohol	4430	ug/l	1.0	-	-	Yes
Isopropyl Alcohol	4890	ug/l	1.0	-	-	Yes
n-Propyl Alcohol	5090	ug/l	1.0	-	-	Yes
n-Butyl Alcohol	5920	ug/l	1.0	-	-	Yes
sec-Butyl Alcohol	5260	ug/l	1.0	-	-	Yes
Methanol	4720	ug/l	1.0	-	-	Yes

Sample ID: JC34496-12MSD
Sample location: BMSMC Building 5 Area
Sampling date: 12/23/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	5600	ug/l	1.0	-	-	Yes
Isobutyl Alcohol	5000	ug/l	1.0	-	-	Yes
Isopropyl Alcohol	5410	ug/l	1.0	-	-	Yes
n-Propyl Alcohol	5270	ug/l	1.0	-	-	Yes
n-Butyl Alcohol	4890	ug/l	1.0	-	-	Yes
sec-Butyl Alcohol	5750	ug/l	1.0	-	-	Yes
Methanol	53705340	ug/l	1.0	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number: JC34496
Date: 12/22-23/2016
Shipping Date: 12/27/2016
EPA Region: 2

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update III, December 1996)," specifically for Methods 8000/8015C are utilized. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The modified data review for VOCs included:

Lab. Project/SDG No.: JC34496 Sample matrix: Groundwater
No. of Samples: 10

Trip blank No.: -
Field blank No.: JC34496-2; JC34496-9
Equipment blank No.: JC34496-7
Field duplicate No.: -

<input checked="" type="checkbox"/> Data Completeness	<input checked="" type="checkbox"/> Laboratory Control Spikes
<input checked="" type="checkbox"/> Holding Times	<input checked="" type="checkbox"/> Field Duplicates
<input type="checkbox"/> N/A GC/MS Tuning	<input checked="" type="checkbox"/> Calibrations
<input type="checkbox"/> N/A Internal Standard Performance	<input checked="" type="checkbox"/> Compound Identifications
<input checked="" type="checkbox"/> Blanks	<input checked="" type="checkbox"/> Compound Quantitation
<input checked="" type="checkbox"/> Surrogate Recoveries	<input checked="" type="checkbox"/> Quantitation Limits
<input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate	

Overall Comments: Low molecular weight alcohols by SW-846 8015C.
4th Q 2016 Groundwater Sampling-Onsite Wells

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Infante
Date: February 3, 2017

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding. All samples properly preserved.				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH ≤ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 ± 2 °C): 5.5°C

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

N/A BFB tuning was performed for every 12 hours of sample analysis.

List the samples affected: _____

4

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below _____

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 10/10/16
 Dates of continuing calibration: 01/03/17
 Dates of final calibration verification: 10/10/10; 01/03/17
 Instrument ID number: GCGH
 Matrix/Level: Aqueous/low

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED

Note: Initial, continuing, and final calibration verifications meets method specific criteria in at least one of the two columns. Final calibration verification included in data packages.

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.

All %RSD must be $\leq 15\%$ regardless of method requirements for CCC.

All %Ds must be $\leq 20\%$ regardless of method requirements for CCC.

It should be noted that Region 2 SOP HW-24 does not specify criterion for the curve correlation coefficient (r). A limit for r of ≥ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05 , estimate positive results (J) and reject nondetects (R), regardless of method requirements.

If any compound has a %RSD $> 15\%$, estimate positive results (J) and use professional judgment to qualify nondetects.

If any compound has a %RSD $> 90\%$, estimate positive results (J) and reject nondetects (R).

If any compound has a % D $> 20\%$, estimate positive results (J) and reject nondetects (R).

If any compound has a % D $> 20\%$, estimate positive results (J) and nondetects (UJ).

If any compound has a % D $> 90\%$, estimate positive results (J) and reject nondetects (R).

If any compound has $r < 0.995$, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/MATRIX	COMPOUND	CONCENTRATION UNITS
		All_method_blank_meeth_method_specific_criteria		

Field/Equipment/Trip blank

[illegible]

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
 ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and \leq AL, report the compound as not detected (U) at the SQL.

If the concentration is \geq SQL but \leq AL, report the compound as not detected (U) at the reported concentration.

If the concentration is \geq SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately

Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	Hexanol	DBFM	TOL-d8	BFB	
	S1 a	S1 b			
JC34496-1	95	83			
JC34496-2	92	86			
JC34496-3	101	80			
JC34496-4	103	81			
JC34496-7	104	79			
JC34496-9 1	10	85			
JC34496-10	96	76			
JC34496-12	107	84			
GGH5601-BS	75	76			
GGH5601-MB1	88	97			
GGH5601-MB2	73	71			
JC34496-12MS	100	83			
JC34496-12MSD	102	84			

(a) Recovery from GC signal #2

(b) Recovery from GC signal #1

Note: All surrogate recoveries within laboratory control limits.

QC Limits* (Aqueous)

____ LL to UL ____ 56 to 145 ____ to ____ to ____ to ____

QC Limits* (Solid-Low)

____ LL to UL ____ to ____ to ____ to ____ to ____

QC Limits* (Solid-Med)

____ LL to UL ____ to ____ to ____ to ____ to ____

1,2-DCA = 1,2-Dichloromethane-d4

DBFM = Dibromofluoromethane

TOL-d8 = Toluene-d8

BFB = Bromofluorobenzene

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.

* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

DATA REVIEW WORKSHEETS

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.
If any one surrogate in a fraction shows < 10 % recovery.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below _____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: JC34496-12MS/-12MSD Matrix/Level: Groundwater/low

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
<u>MS/MSD % recoveries and RPD within laboratory control limits.</u>					

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Region 2 SOP HW-24 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID: _____ - _____ Matrix/Level/Unit: _____ - _____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION
----------	-----------------	----------	-----------	-------	--------

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).

* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

A separate worksheet should be used for each MS/MSD pair.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? **Yes**
 or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
Recoveries within laboratory control limits.			

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

DATA REVIEW WORKSHEETS

All criteria were met _____
 Criteria were not met _____
 and/or see below _____ N/A _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs: _____ - _____

Matrix: _____ - _____

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD \pm 30% for aqueous samples, RPD \pm 50 % for solid samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicates analyzed with this data package. MS/MSD % recovery RPD used to assess precision. RPD within laboratory, generally acceptable and guidance document performance criteria control limits.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

1

All criteria were met N/A
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

- * Area of +100% or -50% of the IS area in the associated calibration standard.
- * Retention time (RT) within 30 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION
------	-----------	--------	---------	------------------	--------

[illegible]

Actions:

- 1. IS actions should be applied to the compound quantitated with the out-of-control ISs**

QUALITY	IS AREA < -25%	IS AREA = -25 % TO - 50%	IS AREA > + 100%
Positive results	J	J	J
Nondetected results	R	UJ	ACCEPT

2. If a IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

JC34496-12MS

Sec-Butyl alcohol

RF = 26.42

$$[] = (139759)/(26.42)$$

$$= 5,290 \text{ ppm OK}$$

XII. QUANTITATION LIMITS

A. Dilution performed

B. Percent Solids

Age (years)	Percentage (%)
18	10
20	15
22	20
24	25
26	30
28	35
30	40
32	45
34	50
36	55
38	60
40	65
42	70
44	75
46	80
48	85
50	90
52	95
54	100

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

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MEMORANDUM

TO: Mr. Haley Royer
Anderson, Mulholland and Associates

DATE: February 3, 2017

FROM: R. Infante 

FILE: JC34496

RE: Data Validation
Building 5 Area, BMSC
4th Q 2016 Groundwater Sampling - Onsite Wells
SDG: JC34496

SUMMARY

Full validation was performed on the data for three groundwater samples analyzed for dissolved methane by method RSK-175. The samples were collected at the Bristol Myer Squib-Building 5 Area, Humacao, PR site on December 22-23, 2016 and submitted to Accutest Laboratories of Dayton, New Jersey that analyzed and reported the results under delivery groups (SDG) JC34496. The sample results were assessed according to USEPA general data validation guidance documents.

In general the data is valid as reported and may be used for decision making purposes. The data results are acceptable for use.

SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
MW-20S	JC34496-1	12/22/16	Groundwater	Methane
RA-10S	JC34496-4	12/22/16	Groundwater	Methane
MW-19	JC34496-10	12/23/16	Groundwater	Methane

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Canister cleaning certification criteria
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody.

Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

Initial and Continuing Calibrations

Initial and continuing calibrations meet method specific requirements. Initial calibration retention times meet method specific requirements.

Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks.

No trip/field/equipment blank analyzed with this data package.

Laboratory/Field Duplicate Results

Laboratory duplicates were analyzed as part of this data set. Target analytes meet the RPD performance criteria of + 25 % for analytes 5 x SQL.

LCS/LCSD Results

LCS (blank spike) was analyzed by the laboratory associated with this data package. Recoveries and RPD within laboratory control limits.

Quantitation Limits and Sample Results

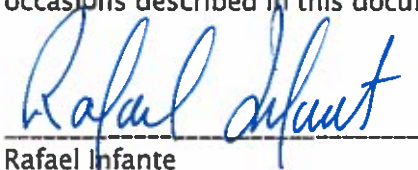
Dilutions were performed in the following cases:

- JC34496-10 – 20 x dilutions; methane concentration over calibration range.

Calculations were spot checked.

Summary

Samples JC34496-1; JC34496-4; and JC34496-10 were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document.



Rafael Infante
Chemist License 1888

SAMPLE METHANE DATA SAMPLE SUMMARY

Sample ID: JC34496-1

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: Groundwater

METHOD: RSK-175

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Methane	26.3	ug/l	1	-	-	Yes

Sample ID: JC34496-4

Sample location: BMSMC Building 5 Area

Sampling date: 22-Dec-16

Matrix: Groundwater

METHOD: RSK-175

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Methane	13.9	ug/l	1	-	-	Yes

Sample ID: JC34496-10

Sample location: BMSMC Building 5 Area

Sampling date: 23-Dec-16

Matrix: Groundwater

METHOD: RSK-175

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Methane	1860	ug/l	20	-	-	Yes

MEMORANDUM

TO: Mr. Haley Royer
Anderson, Mulholland and Associates

DATE: February 3, 2017

FROM: R. Infante

FILE: JC34496

RE: Data Validation
BMSMC, Building 5 Area
4th Q 2016 Groundwater Sampling - Onsite Wells
Accutest Job Numbers: JC34496

SUMMARY

Full validation was performed on the data for three (3) groundwater samples analyzed selected inorganics (iron - ferric and ferrous; nitrate-nitrogen; nitrite-nitrogen; nitrate + nitrite - nitrogen; sulfate and sulfide). The methods employed are listed in Table 1. The samples were collected at the BMSMC, Building 5 Area, Humaco, PR site on December 22-23, 2016 and submitted to Accutest Laboratories of Dayton, New Jersey that analyzed and reported the results under delivery groups (SDG) JC34496.

Table 1.

ANALYTE	METHOD	ANALYTE	METHOD
Iron, ferric ^a	SM3500FE B-11	Iron, ferrous ^b	SM3500FE B-11
Nitrogen, nitrate ^c	EPA353.2/SM4500NO2B	Nitrogen, nitrate + nitrite	EPA352.2/LACHAT
Nitrogen, nitrite	SM4500NO2 B-11	Sulfate	EPA 300/SW846-9056A
Sulfide	SM4500S2-F-11		

(a) Calculated as: (Iron) - (Iron, Ferrous)

(b) Field analysis required. Received out of hold time and analyzed by request.

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: *USEPA Contract Laboratory program National Functional Guidelines for Inorganic data Review (OSWER 9240.1-45, EPA 540-R-04-004, October 2004- Final)*, (noted herein as the "primary guidance document"). Also, QC criteria from *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update IV, December 1998)"*, and the QC requirements for the methods performed following the Standard Method guidelines are utilized. The guidelines were modified to accommodate the non-CLP methodology. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

In general the data are valid as reported and may be used for decision making purposes. The data results are acceptable for use; some of the results were qualified. Results for ferrous and ferric iron were qualified as estimated (J) in all samples: JC34496-1; -4; and -10. Results for Nitrate and Nitrite qualified as estimated (J or UJ) in all samples: JC34496-1; -4; and -10.

SAMPLES

The samples included in the review are listed below

FIELD SAMPLE ID	LABORATORY ID	ANALYSIS
MW-20S	JC34496-1	See Table 1
RA-10S	JC34496-4	See Table 1
MW-19	JC34496-10	See Table 1

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Surrogate spike recovery
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Internal standard performance
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

Holding Times and Sample Preservation

The cooler temperatures were within the QC acceptance criteria of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

Sample preservation was acceptable.

Samples analyzed within method recommended holding time except for the following:

- Samples JC34496-1; -4; -10 for Iron, Ferrous: Field analysis required. Received out of hold time and analyzed by request.
- Samples JC34496-1; -4; and -10 for Iron, Ferric: Field analysis required for ferrous iron. Received out of hold time and analyzed by request.
- Nitrite analysis done past holding time in samples JC34496-1; -4; and -10. The samples were received and analyzed out of holding time.

Note: Results for ferrous and ferric iron qualified as estimated (J). Results for Nitrite and Nitrate qualified as estimated (J).

Initial and Continuing Calibrations

Initial and continuing calibration meets method performance criteria.

Method Blank/Equipment Blank/Field Blank

Target analytes were not detected in laboratory method blanks above the reporting limit.

No field/equipment blanks analyzed as part of this data package.

MS/MSD

Matrix spike was performed. Recoveries for MS/MSD were within laboratory control limits except for the cases described in this document; RPD for MS/MSD were within control limits.

- JC34496-1 - Ferrous MS % recovery: 90.5 %; control limits 92 - 113 %. No action taken, MS % recovery results within generally acceptable control limits.

Field/Laboratory Duplicate Results

Field/laboratory duplicate were analyzed as part of this data set. When no field/laboratory duplicates were analyzed, MS/MSD RPD was used to assess precision. RPD results were within laboratory/recommended control.

LCS/LCSD Results

The laboratory analyzed one LCS (blank spike) associated with each matrix from this data set. The % recoveries of all spiked analytes were within the laboratory QC acceptance limits.

Quantitation Limits and Sample Results

Dilutions were not required with this data set.

Calculations were spot checked.

Summary

The following samples JC34496-1 JC34496-4; and JC34496-10 were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. Some of the results were qualified, the results are valid.



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SAMPLE INORGANIC DATA SAMPLE SUMMARY

Sample ID: JC34496-1

Sample location: BMSMC Building 5 Area

Sampling date: 12/22/2016

Matrix: Groundwater

Analyte Name	Method	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Fe	SW846-6010C	8760	ug/l	1.0	-	-	Yes
Mn	SW846-6010C	315	ug/l	1.0	-	-	Yes
Alkalinity, Total as CaCO3	SM2320 B-11	148	mg/l	1.0	-	-	Yes
Iron, ferric	SM3500FE B-11	8.6	mg/l	1.0	-	J ✓	Yes
Iron, ferrous	SM3500FE B-11	< 0.20	mg/l	1.0	-	UJ ✓	Yes
Nitrogen, nitrate	EPA 353.2/SM4500NO2B	< 0.11	mg/l	1.0	-	UJ ✓	Yes
Nitrogen, nitrate + nitrite	EPA 353.2/LACHAT	< 0.10	mg/l	1.0	-	U ✓	Yes
Nitrogen, nitrite	SM4500NO2 B-11	< 0.010	mg/l	1.0	-	UJ ✓	Yes
Sulfate	EPA 300/SW846 9056A	18.0	mg/l	1.0	-	-	Yes
Sulfide	SM4500S2- F-11	< 2.0	mg/l	1.0	-	U	Yes

Sample ID: JC34496-4

Sample location: BMSMC Building 5 Area

Sampling date: 12/22/2016

Matrix: Groundwater

Analyte Name	Method	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Fe	SW846-6010C	458	ug/l	1.0	-	-	Yes
Mn	SW846-6010C	2260	ug/l	1.0	-	-	Yes
Alkalinity, Total as CaCO3	SM2320 B-11	222	mg/l	1.0	-	-	Yes
Iron, ferric	SM3500FE B-11	0.4	mg/l	1.0	-	J ✓	Yes
Iron, ferrous	SM3500FE B-11	< 0.20	mg/l	1.0	-	UJ ✓	Yes
Nitrogen, nitrate	EPA 353.2/SM4500NO2B	< 0.11	mg/l	1.0	-	UJ ✓	Yes
Nitrogen, nitrate + nitrite	EPA 353.2/LACHAT	< 0.10	mg/l	1.0	-	U ✓	Yes
Nitrogen, nitrite	SM4500NO2 B-11	< 0.010	mg/l	1.0	-	UJ ✓	Yes
Sulfate	EPA 300/SW846 9056A	< 10	mg/l	1.0	-	U	Yes
Sulfide	SM4500S2- F-11	< 2.0	mg/l	1.0	-	U	Yes

Sample ID: JC34496-10
 Sample location: BMSMC Building 5 Area
 Sampling date: 12/23/2016
 Matrix: Groundwater

Analyte Name	Method	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Fe	SW846-6010C	8760	ug/l	1.0	-	-	Yes
Mn	SW846-6010C	1260	ug/l	1.0	-	-	Yes
Alkalinity, Total as CaCO3	SM2320 B-11	156	mg/l	1.0	-	-	Yes
Iron, ferric	SM3500FE B-11	8.4	mg/l	1.0	-	J ✓	Yes
Iron, ferrous	SM3500FE B-11	0.32	mg/l	1.0	-	J ✓	Yes
Nitrogen, nitrate	EPA 353.2/SM4500NO2B	< 0.11	mg/l	1.0	-	UJ ✓	Yes
Nitrogen, nitrate + nitrite	EPA 353.2/LACHAT	< 0.10	mg/l	1.0	-	U	Yes
Nitrogen, nitrite	SM4500NO2 B-11	< 0.010	mg/l	1.0	-	UJ ✓	Yes
Sulfate	EPA 300/SW846 9056A	13.6	mg/l	1.0	-	-	Yes
Sulfide	SM4500S2- F-11	< 2.0	mg/l	1.0	-	U	Yes

DATA REVIEW WORKSHEETS

Type of validation Full: ☒ Limited: _____ EPA Region: 2 Project Number: JC34496 Date: 12/22-23/2016 Date shipped: 12/27/16

REVIEW OF INORGANIC ANALYSIS DATA PACKAGE

The following guidelines for evaluating metals analyses (6010C/6020/7000A series method) sulfide, and/or cyanide were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: *Hazardous Waste Support Section SOP N0. HW-3b Revision 0 (July 2015) ISM02 ICP-MS Data Validation; USEPA Contract Laboratory program National Functional Guidelines for Inorganic data Review (OSWER 9240.1-45, EPA 540-R-04-004, October 2004- Final). Validation of Metal for the Contract Laboratory Program (CLP) (SOP HW-2, Revision 13. Based on ILM05.3 (August 2009).* Quality control validation criteria were derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update IV, 1998)". The project QAPP is reviewed for project specific information (if available). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for inorganic included:

Lab. Project/SDG No.: JC34496 Sample matrix: Groundwater
No. of Samples: 3
Field blank No.: _____
Equipment blank No.: _____
Field duplicate No.: _____

<input checked="" type="checkbox"/> Data deliverables	<input checked="" type="checkbox"/> Laboratory Duplicates
<input checked="" type="checkbox"/> Holding Times	<input checked="" type="checkbox"/> Field Duplicates
<input checked="" type="checkbox"/> Calibrations	<input checked="" type="checkbox"/> Laboratory Control Samples
<input checked="" type="checkbox"/> Blanks	<input checked="" type="checkbox"/> ICP Serial Dilution Results
<input checked="" type="checkbox"/> ICP Interference Check Results	<input checked="" type="checkbox"/> Detection Limits Results
<input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate	<input checked="" type="checkbox"/> Sample Quantitation

Overall Comments: Fe and Mn (SW846-6010C)
4th Q 2016 Groundwater Sampling - Onsite Wells

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated non-detect
E- Laboratory qualifier

Reviewer: Rafael Infante Date: 02/03/2017

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

I. DATA DELIVERABLES

A. Data Package:

MISSING INFORMATION

DATE LAB. CONTACTED

DATE RECEIVED

B. Other Discrepancies:

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of preparation, and subsequently from the time of preparation to the time of analysis.

Complete table for all samples and circle the analysis date for samples not within criteria

SAMPLE ID	DATE SAMPLED	CYANIDE DATE ANALYSIS	Hg DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	SULFIDE	ACTION
SAMPLES DIGESTED AND ANALYZED WITHIN THE METHOD RECOMMENDED HOLDING							

Criteria

Metals – 180 days from time of collection.

Mercury – 28 days from time of collection.

Hexavalent Chromium (solids)- 30/7 from day of collection; 48 hrs aqueous samples

Cyanide – 14 days from time of collection

Sulfide - 14 days from time of collection

pH measurements of aqueous samples upon receipt at the laboratory (criteria $\text{pH} \leq 2$ for metals;

$\text{pH} \geq 12$ for cyanide)

Actions: Qualify positive results/nondetects as follows:

If holding times are exceeded, estimate positive results (J) and rejects nondetects (R).

If $\text{pH} > 2$ for metals or $\text{pH} < 12$ for cyanide, positive results (J) and nondetects (UJ).

Cooler Temperature (Criteria: $4^{\circ}\text{C} + 2^{\circ}\text{C}$): 5.5°C

If cooler temperature is $> 10^{\circ}\text{C}$, flag non-detects as (UJ) and detects as (J).

DATA REVIEW WORKSHEETS

All criteria were met N/A
Criteria were not met
and/or see below

ICP-MS TUNE ANALYSIS

Is the ICP-MS tuned prior to calibration?

Yes or No?

Does the % RSD exceeds 5% for any isotope in the tuning solution?

Yes or No?

Action:

NOTES: For ICP-MS tunes that do not meet the technical criteria, apply the action to all samples reported from the analytical run.

1. If the ICP-MS instrument was not tuned prior to calibration, the sample data should be qualified as unusable (R).

2. If the tuning solution was not analyzed or scanned at least 5x consecutively or the tuning solution does not contain the required analytes spanning the analytical range, the reviewer should use professional judgment to determine if the associated sample data should be qualified. The reviewer may need to obtain additional information from the laboratory. The situation should be recorded in the Data Review Narrative and noted for Contract Laboratory Program Project Officer (CLP PO) action.

3. If the resolution of the mass calibration is not within 0.1 u for any isotope in the tuning solution, qualify all analyte results that are \geq Method Detection Limit (MDL) associated with that isotope as estimated (J), and all non-detects associated with that isotope as estimated (UJ). The situation should be recorded in the Data Review Narrative and noted for CLP PO action.

4. If the %RSD exceeds 5% for any isotope in the tuning solution, qualify all sample results that are \geq MDL associated with that tune as estimated (J), and all non-detects associated with that tune as estimated (UJ). The situation should be recorded in the Data Review Narrative and noted for CLP PO action.

Table 2. ICP-MS Tune Actions for ICP-MS Analysis

ICP-MS Tune Results	Action for Samples
Tune not performed	Qualify all results as unusable (R)
Tune not performed properly	Use professional judgment
Resolution of mass calibration not within 0.1u	Qualify results that are \geq MDL as estimated (J) Qualify non-detects as estimated (UJ)
% RSD > 5%	Qualify results that are \geq MDL as estimated (J) Qualify non-detects as estimated (UJ)

Note:

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

INSTRUMENT CALIBRATION (SECTION 1)

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data. Minimum of 2 calibration points for ICP-AES and ICP-MS; 5 points for Hg; and 4 points for cyanide. One initial calibration standard at the CRQL level for cyanide and Hg. If no, write in the non-compliance section of the data review narrative.

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration Verification standards (ICV or CCV).

<u>Acceptance Criteria</u>	<u>ICV %R</u>	<u>CCV %R</u>
Metals by 6010C/6020	100 + 10%	100 + 10%
Mercury/Metals by 7000s	100 + 10%	100 + 20%
Cyanide	100 + 15%	100 + 15%
Sulfide	100 + 15%	100 + 15%

DATE	ICV/CCV#	ANALYTE	%R	ACTION	SAMPLES AFFECTED
INITIAL AND CONTINUING CALIBRATION MEET METHOD SPECIFIC CRITERIA					

ACTIONS: If any analyte does not meet the %R criteria, follow the actions stated below. Qualify five samples on either side of the ICV/CCV out of control limit.

Estimate positive results (J) if:	ICV	CCV
Metals by 6010C/6020	111 – 125%	111 – 125%
Mercury/Metals by 7000s	111 – 125%	111 – 135%
Cyanide	116 – 130%	116 – 130%
Sulfide	116 – 130%	116 – 130%

Estimate positive results and nondetects (U/UJ) if:		
Metals by 6010C/6020	75 – 89%	75 – 89%
Mercury/Metals by 7000s	75 – 89%	65 – 79%
Cyanide	70 – 84%	70 – 84%
Sulfide	70 – 84%	70 – 84%

Reject positive results and nondetects (R) if:		
Metals by 6010C/6020	<75%, >125%	<75%, >125%
Mercury/Metals by 7000s	<75%, >125%	<65%, >135%
Cyanide	<70%, >130%	<70%, >130%
Sulfide	<70%, >130%	<70%, >130%

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

III. INSTRUMENT CALIBRATIONS (SECTIONS 2 & 3)

2. Analytical Sequence

Did the laboratory use the proper number of standards for calibration as described in the method?

Yes or No

B. Were calibrations performed at the beginning of each analysis?

Yes or No

Were calibration verification standards analyzed at the beginning of sample analysis and the proper frequency according to the method?

Yes or No

D. Where the AA correlation coefficients (r) for the calibration curves ≥ 0.995 ? If $r < 0.995$, estimate positive results and nondetects (J/UJ). It is not necessary to qualify results if the laboratory used order regression.

Yes or No

Data quality may be affected if any of the above answer are "no". Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the sample affected.

3. Other Check Standards

Laboratories may analyze an additional check standard after establishing the calibration curve. This standard may contain low level concentrations of target analytes and be analyzed and evaluated by the laboratory similar to a CLP "CRLD" standard (CRI for ICP, CRA for AA, and/or mid-range standard for CN and Sulfide). A $100 \pm 20\%$ recovery acceptance limit should be used by the validator to evaluate the standard.

ACTIONS: If any analyte does not meet the %R criteria, follow the action needed below. Qualify 50% of either side of the CRI/CRA out of control limits.

% R	%R < 50%	%R = 50-79%	%R = 121-150%	%R > 150%	Affected Range
Qualify Positive/Nondetects Results					
Metals by 6010C/6020	R/R	J/UJ	J/A	R/A	<2x CRI conc.
Hg/metals by 7000s	R/R	J/UJ	J/A	R/A	<1.5x CRI conc.
Cyanide	R/R	J/UJ	J/A	R/A	<1.5x mid std. conc.
Sulfide	R/R	J/UJ	J/A	R/A	<1.5x mid std. conc.

CRI is not required for Al, Ba, Ca, Fe, Mg, Na, and K.

NOTE: CRLD standard within laboratory and method specific criteria.

DATA REVIEW WORKSHEETS

All criteria were met N/A
 Criteria were not met
 and/or see below

Table 4. Calibration Actions for ICP-MS Analysis

Calibration Result	Action for Samples
Calibration not performed	Qualify all results as unusable (R)
Calibration incomplete	Use professional judgment Qualify results that are \geq MDL as estimated (J) Qualify non-detects as estimated (UJ)
Not at least one calibration standard at or below the CRQL for each analyte	Qualify results that are \geq MDL but $< 2x$ the CRQL as estimated (J) Qualify non-detects as estimated (UJ)
Correlation coefficient < 0.995 ; %D outside $\pm 30\%$; y-intercept \geq CRQL	Qualify results that are \geq MDL as estimated (J) Qualify non-detects as estimated (UJ)
Correlation coefficient < 0.990	Qualify results that are \geq MDL as estimated (J) Qualify non-detects as unusable (R)
ICV/CCV %R $< 75\%$	Qualify results that are \geq MDL as unusable (R) Qualify all non-detects as unusable (R)
ICV/CCV %R 75-89%	Qualify results that are \geq MDL as estimated low (J-) Qualify non-detects as estimated (UJ)
ICV/CCV %R 111-125%	Qualify results that are \geq MDL as estimated high (J+)
ICV/CCV %R $> 125\%$	Qualify results that are \geq MDL as estimated high (J+)
ICV/CCV %R $> 160\%$	Qualify results that are \geq MDL as unusable (R)

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

IV. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including equipment, field, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in Sections 1 & 2 below. A separate worksheet page should be used for soil and water blanks.

Laboratory blanks

Matrix: Aqueous

DATE ANALYZED	ICB/CCB#	PREP BLK	ANALYTE	CONCENTRATION UNITS
---------------	----------	----------	---------	---------------------

 No analyte detected in method blanks above reporting limits.

Field/Equipment

Matrix: Aqueous

DATE ANALYZED	EQUIPMENT/FIELD BLANK	ANALYTE	CONCENTRATION UNITS
---------------	-----------------------	---------	---------------------

 No field/equipment blank analyzed as part of this data package.

Table. Field/Rinsate/Trip Blank Actions for ICP-MS Analysis

Blank Result	Sample Result	Action for Samples
> CRQL	≥ MDL but ≤ CRQL	Report CRQL value with a "U"
	> CRQL but < Blank Result	Report at level of Blank Result with a "U"
	> Blank Result but < 10x the Blank Result	Use professional judgment to qualify results as estimated (J)

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

IV. BLANK ANALYSIS RESULTS (Section 3)

Frequency requirements

Was the preparation blank analyzed for each matrix,
at the frequency of the method?

Yes or No

If no, estimate positive results < 10x IDL for which preparation blank was not analyzed.

If more than 20 samples/batch, qualification begins at the 21st sample.

B. Was an ICB analyzed?

Yes or No

C. Was a CCB analyzed at the frequency stated in the method?

Yes or No

Data quality may be affected if any of the above answer is "no". Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

NOTE FOR SOIL SAMPLES

Compare raw sample value with blank results in ug/L unit, or

Convert blanks analyzed during a soil case to mg/Kg in order to compare them with the sample results.

Conc. In ug/L x [Volume diluted to (mL)]/[Weight digested] x 1L/1000mL x 1000g/1Kg x 1mg/1000ug = concentration in wet weight (mg/Kg)

Concentration, dry weight (mg/Kg) = (Wet weight concentration)/(% Solids) x 100

BLANK ANALYSIS RESULTS (Sections 4,5)

Laboratory blanks (PB, ICB/CCB) must first be used to qualify field and/or equipment blanks and samples.

Any contamination remaining in the field or equipment blank will be used to qualify the associated samples.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

4. Initial/Continuing Calibration Blanks (ICB/CCB) Actions

Are all ICB/CCBs less than the SQL?

Yes or No

If no, qualify five samples on either side of the ICB/CCB out of control limits.
 Estimate positive results (J) \leq the ICB/CCB value.

ICB/CCB#	ANALYTE	CONC/UNITS	SAMPLES AFFECTED
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Are the PB less than the SQL?

Yes or No

If yes, reject all results (R) $< 10x$ the PB value.

PB	ANALYTE	CONC/UNITS	SAMPLES AFFECTED
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

BLANK ANALYSIS RESULTS (Section 6)

6. Field/Equipment Blank (FB/EB) Actions

Are the FB/EB less than the SQL?

Yes or No

N/A

If no, was the FB/EB value already rejected due to other QC criteria? Yes or No

If no, reject (R) positive results $\leq 5x$ the FB/EB value. Reject soil data with raw digest results $< 5x$ the FB/EB value

PB	ANALYTE	CONC/UNITS	SAMPLES AFFECTED
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

DATA REVIEW WORKSHEETS

All criteria were met __N/A__
 Criteria were not met
 and/or see below _____

Table 5. Calibration/Preparation Blank Actions for ICP-MS Analysis - Summary

Blank Type	Blank Result	Sample Result	Action for Samples
ICB/CCB	\geq MDL but \leq CRQL	Non-detect	No action
\geq MDL but \leq CRQL		Report CRQL value with a "U"	
> CRQL		Use professional judgment	
ICB/CCB	> CRQL	\geq MDL but \leq CRQL	Report CRQL value with a "U"
> CRQL but < Blank Result		Report at level of Blank Result with a "U"	
> Blank Result		Use professional judgment	
ICB/CCB	\leq (-MDL) but \geq (-CRQL)	\geq MDL, or non-detect	Use professional judgment
ICB/CCB	< (-CRQL)	< 10x the CRQL	Qualify results that are \geq CRQL as estimated low (J-) Qualify non-detects as estimated (UJ)
Preparation Blank	> CRQL	\geq MDL but \leq CRQL	Report CRQL value with a "U"
> CRQL but < 10x the Blank Result		Qualify results as estimated high (J+)	
\geq 10x the Blank Result		No action	
Preparation Blank	\geq MDL but \leq CRQL	Non-detect	No action
\geq MDL but \leq CRQL		Report CRQL value with a "U"	
> CRQL		Use professional judgment	
Preparation Blank	< (-CRQL)	< 10x the CRQL	Qualify results that are \geq CRQL as estimated low (J-) Qualify non-detects as estimated (UJ)

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

INDUCTIVELY COUPLED PLASMA (ICP) INTERFERENCE CHECK SAMPLE

The assessment of the ICP interference check sample (ICS) is to verify the laboratory's interelement and background correction factors.

1. Recovery Criteria

List any elements in the ICS AB and ICS A solutions which did not meet the %R criteria (80 – 120 %).

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED
<u>Interference check sample within method performance criteria</u> _____				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

ACTIONS:

If an element does not meet the %R criteria, follow the actions stated below

% R	%R < 50%	%R = 50-79%	%R = 121-150%	%R > 150%
Qualify Positive/Nondetects Results				
Metals by 6010C/6020	R/R	J/UJ	J/A	R/A

2. Frequency requirements

Were interference QC samples run at the frequency stated in the method (beginning of the analytical run)?

Yes or No

If no,

ACTIONS: Estimate positive results (J) all samples for which Al, Ca, Fe, Mg > ICS value.

The data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

DATA REVIEW WORKSHEETS

All criteria were met ____N/A____
 Criteria were not met
 and/or see below ____

Table 6. Interference Check Actions for ICP-MS Analysis - Summary

Interference Check Sample Results	Action for Samples
ICS not analyzed	Qualify detects and non-detects as unusable (R)
ICS not analyzed in proper sequence	Use professional judgment.
ICS %R>150%	Use professional judgment
ICS %R > 120% (or greater than true value + 2x the CRQL)	Qualify results that are \geq MDL as estimated high (J+)
ICS %R 80-12-%	No qualification
ICS %R 50-79% (or less than true value – 2x the CRQL)	Qualify results that are \geq MDL as estimated low (J-) Qualify non-detects as estimated (UJ)
ICSAB %R < 50%	Qualify detects as estimated low (J-) and non-detects as unusable (R)
Potential false positives in field samples with interferences	Qualify results that are \geq MDL as estimated high (J+)
Potential false negatives in field samples with interferences	Qualify results that are \geq MDL but < 10x the (negative value) as estimated low (J-) Qualify non-detects as estimated (UJ)

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

VI. MATRIX SPIKE (MS)

Sample # TC96643-1MS/-1MSD Matrix: Groundwater Units: ug/L

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. Note that for Region 2, MS not required for: Ca, Mg, K, and Na for aqueous matrix.

Al, Ca, Fe, Mg, K, Na, for soil matrix

MS Recovery Criteria. List the percent recoveries for analytes which did not meet the %R criteria (75 – 125%); (85 – 115 % FOR Cr (VI)).

ANALYTE	SPIKE SAMPLE RESULT (SSR)	SAMPLE RESULT (SR)	SPIKE ADDED	% R	ACTION
MS/MSD recoveries and RPD within laboratory control limits.					

ACTIONS: Matrix spike actions apply to all samples of the same matrix. The qualification will also be applied to the results of all samples within a given area of the site, if deemed appropriate.

If the sample results $\geq 4x$ the spike concentration, no action is taken.

If any analyte does not meet the %R criteria, follow the actions stated below.

Table 9. Spike Sample Actions for ICP-MS Analysis

Spike Sample Results	Action for Samples
Matrix Spike %R < 30% Post-digestion spike %R < 75%	Qualify affected results that are \geq MDL as estimated low (J-) and affected non-detects as unusable (R)
Matrix Spike %R < 30% Post-digestion spike %R \geq 75%	Qualify affected results that are \geq MDL as estimated (J) and affected non-detects as estimated (UJ)
Matrix Spike %R 30-74% Post-digestion Spike %R < 75%	Qualify affected results that are \geq MDL as estimated low (J-) and affected non-detects as estimated (UJ)
Matrix Spike %R 30-74% Post-digestion spike %R \geq 75%	Qualify affected results that are \geq MDL as estimated (J) and affected non-detects as estimated (UJ)
Matrix Spike %R > 125% Post-digestion spike %R > 125%	Qualify affected results that are \geq MDL as estimated high (J+)
Matrix Spike %R > 125% Post-digestion spike %R \leq 125%	Qualify affected results that are \geq MDL as estimated (J)

DATA REVIEW WORKSHEETS

Spike Sample Results	Action for Samples
Matrix Spike %R < 30% No post-digestion spike performed	Qualify affected results that are \geq MDL as estimated low (J-) and affected non-detects as unusable (R)
Matrix Spike %R 30-74% No post-digestion spike performed	Qualify affected results that are \geq MDL as estimated low (J-) and non-detects as estimated (UJ)
Matrix Spike %R > 125% No post-digestion spike performed	Qualify affected results that are \geq MDL as estimated high (J+) Non-detects are not qualified

2. Frequency Criteria

A. Was a matrix spike prepared at the frequency stated in the method (1/20)? Yes
or No

If no, estimate positive results (J) for which analyte was not spiked.

If more than 20 samples/batch, qualification begins at the 21st sample.

B. Was a field blank used as spiked sample? Yes or No

If yes, estimate positive results (J) < 4x spike level added for the analyte.

A separate worksheet page should be used for each matrix spike

DATA REVIEW WORKSHEETS

All criteria were met N/A
 Criteria were not met
 and/or see below

VII. FIELD DUPLICATES

Sample #: - Matrix: - Units: ug/L

Field duplicate samples may be taken and analyzed as an indication of overall precision. Field duplicate analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measure only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

List the concentrations and RPDs in the field duplicate pair. RPD criteria: $\pm 20\%$ for aqueous; $\pm 35\%$ for soil. For soil duplicates, if the % solids for the sample and its duplicate differ by more than 1%, report concentrations in ug/L and calculate RPD or difference for each analyte.

ANALYTE	SQL ug/L	SQL ug/Kg	SAMPLE RESULTS	DUPLICATE RESULTS	RPD	ACTION
Al						
Sb						
As	No field/laboratory duplicates analyzed with data set. MS/MSD % recoveries RPD used to assess precision. RPD within laboratory and generally acceptable control limits					
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu						
Fe						
Pb						
Mg						
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na						
Tl						
V						
Zn						
Cyanide						
Cr(VI)						

Field duplicate actions should be applied to only the sample and its duplicate.

DATA REVIEW WORKSHEETS

All criteria were met ___N/A___
 Criteria were not met
 and/or see below _____

Actions: Indicates which criterion was used to evaluate precision by circling either the RPD or SQL for each element. If both sample and duplicate are nondetects, the RPD is not calculated (NC), no action is needed.

Table 8. Duplicate Sample Actions for ICP-MS Analysis

Duplicate Sample Results	Action for Samples
<i>Aqueous:</i> Both original sample and duplicate sample > 5x the CRQL and 20% < RPD < 100%	Qualify those results that are ≥ CRQL as estimated (J)
<i>Aqueous:</i> Both original sample and duplicate sample > 5x the CRQL and RPD ≥ 100%	Qualify those results that are ≥ CRQL as unusable (R)
<i>Soil/Sediment:</i> Both original sample and duplicate sample > 5x the CRQL and 35% < RPD < 120%	Qualify those results that are ≥ CRQL as estimated (J)
<i>Soil/Sediment:</i> Both original sample and duplicate sample > 5x the CRQL and RPD ≥ 120%	Qualify those results that are ≥ CRQL as unusable (R)
Original sample or duplicate sample ≤ 5x the CRQL (including non-detects) and absolute difference between sample and duplicate > CRQL	Qualify those results that are ≥ MDL as estimated (J) and non-detects as estimated (UJ)

A separate worksheet page should be used for each laboratory duplicate analysis

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

VIII. LABORATORY DUPLICATES (Section 1)

Laboratory run duplicates samples to verify laboratory consistency and precision. They are a measure of laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

1. Difference Criteria

List the concentrations of any analyte not meeting the RPD criteria ($\pm 20\%$ for aqueous; $\pm 35\%$ for soil). For soil duplicates, if the % solids for the sample and its duplicate differ by more than 1%, report concentrations in $\mu\text{g/L}$ and calculate RPD or difference for each analyte.

Sample # TC96643-1/-1_DUP

Matrix: Groundwater

Units: ug/l

ANALYTE	SQL ug/L	SQL mg/Kg	SAMPLE RESULTS	DUPLICATE RESULTS	RPD	ACTION
Al						
Sb						
As						
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu						
Fe						
Pb						
Mg						
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na						
Tl						
V						
Zn						
Cr(VI)						
Sulfide						
Cyanide						

Note: Laboratory duplicate RPD within laboratory control limits.

Laboratory duplicates actions should be applied to all other samples of the same matrix type. This qualification will also be applied to the results of all samples within a given area of the site, if deemed appropriate.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

Actions: Indicates which criterion was used to evaluate precision by circling either the RPD or SQL for each element. If both sample and duplicate are non-detects, the RPD is not calculated (NC), no action is needed.

Table 8. Field Duplicate Sample Actions for ICP-MS Analysis

Sample Type	Field Duplicate Result	Action for Samples
Aqueous	Sample and its field duplicate $\geq 5x$ the CRQL and RPD $> 20\%$	Qualify sample and its duplicate as estimated (J)
	Sample and/or its field duplicate $< 5x$ the CRQL and absolute difference $>$ the CRQL	Qualify results $>$ the MDL as estimated (J) Qualify non-detects as estimated (UJ)
Soil/Sediment	Sample and its field duplicate $\geq 5x$ the CRQL and RPD $> 50\%$	Qualify sample and its duplicate as estimated (J)
	Sample and/or its field duplicate $< 5x$ the CRQL and absolute difference $> 2x$ the CRQL	Qualify results $>$ the MDL as estimated (J)
		Qualify non-detects as estimated (UJ)

2. Frequency Criteria

A. Was a laboratory duplicate prepared at the frequency stated in the method (1/20)? **Yes or No**

If no, estimate positive results (J) for the analyte which duplicate was not performed. If more than 20 samples/batch, qualification begins at the 21st sample.

B. Was a field blank used for laboratory duplicate analysis? **Yes or No**

If yes, estimate positive results (J) for the analyte if field blank was used for duplicate analysis.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

IX. LABORATORY CONTROL SAMPLE (LCS/LCSD)

The assessment of the LCSs is to determine both intralaboratory contamination and matrix specific precision and accuracy. Note that for Region 2, LCS is not required for aqueous Hg and Cyanide.

LCS Recoveries Criteria

A. Aqueous LCS/Solid LCS

List any LCS recoveries not within %R criteria (80 – 120%) and the samples affected.

DATE	ELEMENT	% R	ACTION	SAMPLES AFFECTED
<u>Recoveries_within_laboratory_control_limits</u>				

ACTIONS: If analyte does not meet the %R criteria, follow the actions stated below:

Table 7. LCS Actions for ICP-MS Analysis

LCS Result	Action for Samples
%R 40-69%	Qualify results that are \geq MDL as estimated low (J-) Qualify non-detects as estimated (UJ)
%R > 130%	Qualify results that are \geq MDL as estimated high (J+)
%R 70-130%	No qualification
%R < 40%	Qualify results that are \geq MDL as estimated low (J-) Qualify non-detects as unusable (R)
%R > 150%	Qualify detects as unusable (R) ; non-detects no qualification

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

2. Frequency Criteria

A. Was a laboratory control sample prepared at the frequency stated in the method (1/20)?
Yes or No

If no, estimate positive results (J) for the analyte if LCS was not performed.

If more than 20 samples/batch, qualification begins at the 21st sample.

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

X. ICP SERIAL DILUTION ANALYSIS (Section 1)

The assessment of the ICP serial dilution analysis is to determine the precision of the laboratory through a 5x dilution.

1. Percent Difference (%D) Criteria:

 X Serial dilutions were performed for each matrix and results for the diluted samples analysis agreed within 10% of the undiluted analysis for the analyte concentrations \leq 50x MDL.

 Serial dilutions were not performed for the following target analytes:

 Serial dilutions were performed, but analytical results did not agree within 10% difference for analyte concentrations $>$ 50x IDL before dilution.

List the %Ds for analytes which did not meet the %D criteria (10%/100%)

Sample # TC96643-1 Matrix: Groundwater Units: ug/L

ANALYTE	IDL	50x IDL	SAMPLE RESULTS	SERIAL DILUTION	%D	ACTION
Al						
Sb						
As						
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu						
Fe						
Pb						
Mg						
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na						
Tl						
V						
Zn						

Note: Serial dilution within method performance criteria.

DATA REVIEW WORKSHEETS

All criteria were met __X__
 Criteria were not met
 and/or see below

ACTIONS: Actions apply to all samples of the same matrix. The qualification will also be applied to the results of all samples within a given area of the site, if deemed appropriate. Qualify only samples with raw results > 50x MDL.

Flag results with an (E) for elements exhibiting %D > 10%.

Estimate (J) positive results > 50x MDL for elements that exhibited %D > 10 but < 100.

Reject (R) positive results > 50x MDL for elements which exhibited %D ≥ 100%.

SERIAL DILUTION ANALYSIS (Section 2)

2. Frequency Criteria

A. Was a serial dilution analysis prepared as required by the method? **Yes or No**

If no, estimate positive results ≥ 50x MDL (J) for the analyte which serial dilution analysis was not performed.

B. Was a field blank used for serial dilution analysis? **Yes or No**

If yes, estimate positive results ≥ 50x MDL (J) for the analyte if field blank was used for serial dilution analysis.

Table 10. Serial Dilution Actions for ICP-MS Analysis

Serial Dilution Result	Action for Samples
<i>Aqueous:</i> Sample concentration > 50x MDL and 10% < %D < 100%	Qualify affected results whose raw data are > MDL as estimated (J)
<i>Aqueous:</i> Sample concentration > 50x MDL and %D ≥ 100%	Qualify affected results whose raw data are > MDL as unusable (R)
<i>Soil/Sediment:</i> Sample concentration > 50x MDL and 15% < %D < 120%	Qualify affected results whose raw data are > MDL as estimated (J)
<i>Soil/Sediment:</i> Sample concentration > 50x MDL and %D ≥ 120%	Qualify affected results whose raw data are > MDL as unusable (R)
Interferences present	Use professional judgment

A separate worksheet page should be used for each serial dilution analysis.

DATA REVIEW WORKSHEETS

All criteria were met __N/A__
Criteria were not met
and/or see below _____

XI. ICP-MS INTERNAL STANDARDS

Are internal standard added to the sample? Yes_or No?

Are the proper number of internal standard added to the sample? Yes or No?

Is the % Relative Intensities for all internal standards in a sample is within 60-125% of the response in the calibration blank? Yes or No?

Note: ICP-OES_internal_standards_used;_relative_intensities_within_the_guidance_
_document_performance_criteria. _____

Action:

NOTE: Apply the action to the affected analytes for each sample that does not meet the internal standard criteria.

1. If no internal standards were analyzed with the run, the sample data should be qualified as unusable (R). Record this in the Data Review Narrative and note for CLP Project Officer (CLP PO) action.

2. If less than five of the required internal standards were analyzed with the run, or a target analyte(s) is (are) not associated to an internal standard, the sample data, or analyte data not associated to an internal standard should be qualified as unusable (R). Record this in the Data Review Narrative and note for CLP PO action.

3. If the % Relative Intensities for all internal standards in a sample is within 60-125% of the response in the calibration blank, the sample data should not be qualified.

4. If the %RI for an internal standard in a sample is not within the 60-125% limit, qualify the data for those analytes associated with the internal standard(s) outside the limit as follows:

a. If the sample was reanalyzed at a two-fold dilution with internal standard %RI within the limits, report the result of the diluted analysis without qualification. If the %RI of the diluted analysis was not within the 60-125% limit, report the results of the original undiluted analyses and qualify the data for all analytes that are \geq Method Detection Limit (MDL) in the sample associated with the internal standard as estimated (UJ).

b. If the sample was not reanalyzed at a two-fold dilution, the reviewer should use professional judgment to determine the reliability of the data. The reviewer may determine that the results are estimated (J) or unusable (R).

DATA REVIEW WORKSHEETS

Table 11. Internal Standard Actions for ICP-MS Analysis

Internal Standard Results	Action for Samples
No internal standards	Qualify all results as unusable (R)
< 5 of the required internal standards	Qualify all results as unusable (R)
Target analyte not associated with internal standard	Qualify all analyte results not associated with an internal standard as unusable (R)
% RI < 60% or > 125%, original sample reanalyzed at 2-fold dilution, and % RI of diluted sample analysis is between 60% and 125%	Do not qualify the data
% RI < 60% or > 125%, original sample reanalyzed at 2-fold dilution, and % RI of diluted sample analysis is outside the 60% to 125% limit	Qualify analytes associated with the failed internal standard that are \geq MDL as estimated (J) and qualify associated non-detects as estimated (UJ)
Original sample not reanalyzed at 2-fold dilution	Use professional judgment Qualify sample results as estimated (J) or unusable ®

DATA REVIEW WORKSHEETS

XII. DETECTION LIMITS RESULTS

The detection limit assessment is to verify that samples results are within instrument calibration range or linear range (ICP).

Instrument Detection Limits (IDL). Note IDL is not required for Cyanide.

A. IDL/MDL (or lowest quantitation limit used) results were present and found to be at levels that meet the project objectives? Yes or No

B. IDL/MDL (or lowest quantitation limit used) were not met for the following elements: _____

2. Reporting Requirements

A. Were sample results on Form I (or equivalent) reported down to the IDL/MDL or lowest quantitation limit used for all analytes? Yes or No

B. Were sample weights, volumes, and dilutions taken into account when reporting results (positive and nondetects)? Yes or No

If no, the reported results may be inaccurate. Request the laboratory resubmit the corrected data.

3. Sediment Sample Percent Solids (% solids):

A. Were the % solids for any sediment samples $< 50\%$ but $\geq 10\%$? Yes or No
If yes, estimate positive results and nondetects (J/UJ) if the % solids is 10-50%. List the affected samples: _____

B. Were the % solids for any sediment samples $< 10\%$? Yes or No
If yes, reject all results (R) if the % solid is $< 10\%$. List the affected samples: N/A _____

XI. TOTAL/DISSOLVED OR INORGANIC/TOTAL ANALYTES

A. Were any analyses performed for dissolved as well as total analytes on the same sample(s)? Yes or No

B. Were any analyses performed for inorganic as well as total analytes on the same sample(s)? Yes or No

If yes, compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference as a percent of the total analyte only when both of the following conditions are fulfilled:

- (1) The dissolved (or inorganic) concentration is greater than total concentration, and
- (2) greater than or equal to 5xMDL.

DATA REVIEW WORKSHEETS

All criteria were met N/A
Criteria were not met
and/or see below

- C. Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%? Yes or No
- D. Is any dissolved (or inorganic) concentration greater than its total concentration by more than 50%? Yes or No

ACTION:

If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) both the values.

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results.

 X Sample results fall within the linear range for ICP and within the calibration range for all other parameters.

 If samples results were beyond the linear range/calibration range of the instrument, were dilution performed?

List the affected samples/elements/dilution:

In the space below, please show a minimum of one sample calculation per method:

ICP/ICP-MS Computer printout

Hg/Metals by AA

Hexavalent Chromium

Cyanide

Others

For soil samples, the following equation may be necessary to convert raw data values reported in ug/L to actual sample concentrations (mg/Kg):

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to, mL}}{\text{Weight digested, g}} \times \frac{1\text{L}}{1000\text{ mL}} \times \frac{1000\text{ g}}{1\text{ Kg}} \times \frac{1\text{ mg}}{1000\text{ mg}} = \text{concentration in wet weight mg/Kg}$$

In addition the sample results are converted to dry weight by using the percent solid calculations:

Wet weight concentration x 100 = final concentration, dry weight (mg/Kg) % solids

DATA REVIEW WORKSHEETS

OVERALL ASSESSMENT

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the QC criteria previously discussed.
2. Write a brief Data Review Narrative to give the user an indication of the analytical limitations of the data. Note any discrepancies between the data and the Sample Delivery Group (SDG) Narrative for Contract Laboratory Program Project Officer (CLP PO) action. If sufficient information on the intended use and required quality of the data is available, the reviewer should include an assessment of the data usability within the given context.
3. If any discrepancies are found, the laboratory may be contacted by the Region's designated representative to obtain additional information for resolution. If a discrepancy remains unresolved, the reviewer may determine that qualification of the data is warranted.

Note: _____

